THE IRON TRADE REVIEW

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# Plant Activities Are Increasing

## Buyers More Anxious Than Sellers—More Furnaces Being Blown In—Russia Buys Rails

INDUSTRIAL activity is expanding and the buying of pig iron and finished material is very heavy, while inquiries for material for export are accompanied by insistent requests for earliest possible delivery. The Steel Corporation is blowing in more blast furnaces and is now operating about 90 per cent of its blast furnace capacity. The Corporation has taken orders for 65,000 tons of rails for Russia, making the total orders for rails and track material for that country placed with American mills between 250,000 and 300,000 tons.

**Railroad Buying**

Shipments of rails recently placed by Russia with the Steel Corporation and the Lackawanna Steel Co. are now being made. One lot of 11,000 tons and two of 5,000 tons each for Vladivostok were shipped from eastern ports via Panama canal. Another lot of 8,000 tons was shipped on a steamer from Seattle bound for Vladivostok. Owing to the rolling of large rounds by rail mills, deliveries of rails and track materials to some buyers are falling behind. The outlook for buying of cars is somewhat more encouraging, but few contracts are being made.

**Pig Iron**

Although pig iron prices have continued to advance steadily during the past week, activity of buyers has not abated. It is true that in many cases inquiries have not resulted in orders being placed, but this is frequently due to the conservative policy of the sellers, who are not anxious to take on orders for large tonnages for delivery during the first half of next year. An illustration of this policy is found in the Philadelphia district, where there is considerable inquiry for next year upon which the furnaces are not acting. One buyer in that territory has offered $15.50, delivered, for 10,000 tons of basic, and another would like to purchase from 30,000 to 35,000 tons. An eastern buyer not in the Philadelphia district is inquiring for from 6,000 to 8,000 tons of basic for the first quarter of next year. In the New York territory, the sales of the week amounted to a large tonnage, including from 10,000 to 15,000 tons placed by New Jersey melters. One of the important inquiries pending in New York is for 20,000 tons of mixed grades for next year's delivery to a consumer having a number of plants. The National Enameling & Stamping Co., St. Louis, has purchased from Chicago furnaces from 5,000 to 8,000 tons of basic for first quarter delivery. A large sale of malleable also was made at Chicago last week. At Cincinnati a melter has bought 4,000 to 5,000 tons of foundry iron for the last half.

**Machinery**

Russia, England and France have placed large additional orders for all kinds of machine tools for manufacturing munitions and many important inquiries are pending. The United Switch & Signal Co. has purchased from $250,000 to $300,000 worth of machine tools and the Milton Mfg. Co. has purchased about the same number. The Baldwin Locomotive Works, American Locomotive Co. and the General Electric Co. are in the market for large numbers of lathes and other equipment, but the manufacturers are unable to give promises of satisfactory delivery.

**Pipe**

The sharp decline in the price of spelter has brought about a reduction in quotations on galvanized pipe, ranging from $8 to $12 per ton, according to size. The decline in spelter has also affected the galvanized sheet market on which quotations now range from 3.75c to 4c, Pittsburgh, on No. 28 gage. Full extras are still obtained on galvanized wire.

**Bars**

The latest inquiry for bar material for the manufacture of shrapnel is for 100,000 tons for one of the European nations. Many other inquiries of similar character are pending. The demand from automobile manufacturers is also very strong and it is evident that they will not be able to obtain desired deliveries.

# THE OPEN HEARTH

## Breaking Records in Steel

WITH the beginning of July, the steel industry of the United States entered a period of high-tide production which promises to shatter all previous records. The ingot output of the works in July probably reached the highest pitch for any single month in history and it is estimated by those competent to determine it that it was almost 3,000,000 tons, or at the rate of 36,000,000 tons annually. The steel production of the Steel Corporation last month set a new high record for that interest. It is estimated that the open hearth plants of the country now are operating at practically 100 per cent and the bessemer works at 90 per cent capacity. This does not mean that the full theoretical outputs are being obtained. That, obviously, never is possible for any length of time, owing to the wearing out of linings, repairs, accidents, etc.

With the opening of the last half on an unprecedented scale of output, there is considerable speculation as to what will be the ingot figure reached during the next 12 months or—which is more difficult to forecast—what it will be for the calendar year of 1916. Under present circumstances, the answers to such questions depend upon the continuance of the present European war. After all has been said and done, it is patent that the direct and indirect effects of the great conflict overseas are the substance of the present heavy movement of steel, for purely domestic trade still is reviving in a moderate way and certainly not sufficiently to maintain present operations. On the assumption that the European war will continue for another year, it is predicted in well-informed steel circles, though predictions always are perilous, that the ingot production of the country from July, 1915, to July, 1916, will run 35,000,000 tons or more. The largest year's total heretofore was in 1913, when 31,300,000 tons were produced. If the conflict should go on for 18 months from date, the belief generally is held that the year of 1916 by far will be the largest in the history of the iron and steel industry of the United States. Then it may be that Mr. Schwab's prediction several years ago of a 40,000,000-ton yield in 12 months, may be realized. If the war should end at an earlier date, the production might continue without diminution, or it might decrease sharply. No man can safely predict what would happen.

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The growing importance of open hearth steel as compared with bessemer is shown in lean years as well as years of prosperity. The statistics of production of steel ingots and castings within the year 1914, recently made public by the American Iron and Steel Institute, show that the decrease in production of bessemer steel in 1914 as compared with 1913 was 33-1/3 per cent, while the decrease in production of open hearth steel was only 19 per cent. It is also interesting to note that the production of duplex steel ingots and castings shows a decrease of 62 per cent, the tonnage for 1914 being 835,690, which is included in the 16,271,129 tons of basic open hearth steel ingots and castings produced in 1914.

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## British and American Iron Trade Statistics

THE passing out of existence of the British Iron Trade Association, after what *The Ironmonger* describes as a "lingering illness", has brought to a crisis in England the question as to how statistical information relating to iron and steel industries of the kingdom shall be collected. Local conditions in different parts of England are causing the solution of the problem to be somewhat difficult, but both *The Ironmonger* and *The Iron and Coal Trades Review* advocate entrusting this important work to the Iron and Steel Institute of London, the great organization which has done so much in a technical way to promote progress in the manufacture of iron and steel. *The Iron and Coal Trades Review* points out very clearly that the American Iron and Steel Institute found that, in order thoroughly to fulfill its mission, it was necessary to be more than a technical society and include in its scope certain commercial considerations. "We do not believe," says the *Review*, "that at the present moment the council of the Iron and Steel Institute can fully appreciate the feeling which exists among the members against giving a too theoretical character to the proceedings. It is safe to say that few of the members have any interest in these discussions, and that, when the meetings are held, more and more are the members found in the lobby outside, discussing the commercial aspects of the trade among themselves in preference to listening to dry-as-dust discussions in the meeting room."

We believe that the journals of the iron trade in England are entirely right in urging that the statistical work be done by the Iron and Steel Institute. Certain it is that the collection of statistics by the American Iron and Steel Institute has been eminently successful. James M. Swank, who for so many years was statistician of the iron trade in the United States, has a worthy successor in William G. Gray, who was trained by Mr. Swank, and now has the powerful support of the American Iron and Steel Institute.

# THE OPEN HEARTH

If the same policy should be adopted by the British iron trade, there would soon be an end to the complaint made by our London contemporary in regard to belated and incomplete statistics of the trade. American statistics are accurate and up-to-date.

## Various Brands of Patriotism

AN IMPORTANT feature of war conditions in England is the official recognition of the fact that patriotism in war times does not necessarily consist of enlisting in the army, but may find expression in services of the highest value at home. The British army and the admiralty are issuing badges, showing that men have engaged in work on war material. These are considered as positive evidence of patriotism as is enlistment. This policy is all right as far as it goes, and of course, it is important to recognize in war time all patriotic services by the bestowal of badges and in other ways. In countries not at war it would be entirely out of the question to recognize by badges or otherwise all patriotic services. Nevertheless, the present is an excellent time for emphasizing the fact that this country needs the unselfish, patriotic services of its best citizens.

This fact is recognized by many prominent business men, as shown by the active part which is being taken by them in the military training camp at Plattsburg, N. Y., as referred to elsewhere in this issue. Under the direction of General Leonard Wood, iron and steel manufacturers and other busy men are receiving instructions of real value in order that they may act as a reserve force of volunteer officers, and be ready to respond to the colors, if their country should need them. Not only the men who are giving themselves to this service, but also the companies which have donated equipment and those who have financed the camp are deserving of high praise. Even the very vigorous language used by General Wood last Friday in addressing the training camp, was not too strong in showing how utterly unprepared this country is to defend itself. A somewhat different form of patriotism is that being shown by leading manufacturers in the United States who are encouraging employes to join the militia.

A non-military kind of patriotism which this country needs very badly is service of business men on juries. Investigation in some states has clearly demonstrated that many jurors sitting on important cases are either corrupt or woefully incompetent. This is particularly true in suits for damages resulting from accidents. In some centers of industrial activity, lawyers are reaping rich harvests in conducting damage suits before jurors who readily yield to their blandishments. One business man of intelligence and courage on a jury could do much to check the tendency to return large verdicts against manufacturers with little regard for the evidence. If only a few busy men who are capable of understanding law and evidence would give their time and thought to jury service, a large number of manufacturers would be relieved of the grave danger of being forced into bankruptcy by damage suits—a peril which is indeed real in some states.

## A Labor Problem of War

SOME unusual problems are being forced on the industries of the country by the European war. One of these now is being aired in the machinists' strike in plants manufacturing war munitions, which has been sweeping through New England, New York, New Jersey and other eastern states. The men in the final analysis are demanding some share of the extraordinary profits which are coming about as the result of war orders. They ostensibly are fighting for an eight-hour day, but they want the present wage rate for a longer work day maintained, which is in effect a substantial advance in pay.

Not a few manufacturers believe the circumstances clearly indicate that the workers should receive some benefit of the present unusual conditions and are willing to make some division of their unexpected gains. But the problem immediately presents itself as to how this distribution can be brought about without fastening upon themselves precedents as to length of work day, rates of wages, etc., which cannot be discontinued at will and will remain a source of future trouble and handicap for their business after the war.

Accordingly, bonus systems, formal distribution in gold to the men of a portion of the profits, and other plans are being adopted and care is being taken not to have these confused with regular wage payments. An effort is being made to impress upon the men that there can be no assurance of permanency in the present conditions and what they now are receiving are war-time benefits which the normal domestic trade does not or cannot warrant.

The labor leaders, seeing in the situation opportunities to establish fixed advantages which will survive the present time, are strenuously opposing the attempts of the employers to deal with the men on anything but a straight wage and work day basis.

Here is the root of the present labor struggle in the east, the settlement of which is fraught with important, if not serious consequences, for all employers.

## Prices Present and Past

*Quotations on leading products August 18, average for July, 1915, average for May, 1915, and average for August, 1914. Prices are those ruling in the largest percentage of sales at the dates named.*

| | Prices Aug. 18. 1915. | Average for July, 1915. | Average for May, 1915. | Average for Aug., 1914. |
|---|---|---|---|---|
| Bessemer pig iron, Pittsburgh.. | $16.20 | $14.88 | $14.55 | $14.90 |
| Basic pig iron, Pittsburgh..... | 14.90 | 13.88 | 13.45 | 13.90 |
| No. 2 Fdy. pig iron, Pittsburgh | 14.95 | 13.60 | 13.45 | 13.90 |
| Northern No. 2 Fdy., Chgo..., | 13.50 | 13.00 | 13.00 | 14.00 |
| Lake Superior Charcoal, Chgo.. | 16.25 | 15.55 | 15.25 | 15.75 |
| Mall., Bess., Chgo..... | 13.50 | 13.00 | 13.00 | 14.00 |
| Southern No. 2, Birmingham... | 11.50 | 9.75 | 9.50 | 10.00 |
| Southern Ohio No. 2, Ironton.. | 14.00 | 12.75 | 12.75 | 13.50 |
| Basic, eastern Pa..... | 15.50 | 13.85 | 13.25 | 14.00 |
| No. 2X Virginia furnace..... | 12.50 | 12.50 | 12.50 | 12.50 |
| No. 2X foundry, Philadelphia... | 15.25 | 14.40 | 14.25 | 14.75 |
| Ferro mang., Balt., (prompt).. | 100.00 | 101.20 | 100.00 | 125.00 |
| Bessemer billets, Pbgh..... | 23.00 | 21.40 | 19.50 | 20.00 |
| Bess. sheet bars, Pbgh..... | 24.00 | 21.70 | 20.00 | 21.00 |
| Open hearth sheet bars, Pbgh.. | 25.00 | 22.00 | 20.00 | 20.20 |
| Open hearth billets, Pbgh..... | 24.00 | 21.50 | 19.50 | 19.30 |
| Steel bars, Chicago..... | 1.49 | 1.46 | 1.39 | 1.36 |
| Steel bars, Pittsburgh..... | 1.30 | 1.26 | 1.20 | 1.175 |
| Iron bars, Philadelphia..... | 1.40 | 1.20 | 1.17 | 1.20 |
| Iron bars, Cleveland, local del'y. | 1.25 | 1.20 | 1.15 | 1.20 |

| | Prices Aug. 18. 1915. | Average for July, 1915. | Average for May, 1915. | Average for Aug., 1914. |
|---|---|---|---|---|
| Iron bars, Chgo. mill..... | 1.25 | 1.20 | 1.15 | 1.07 |
| Beams, Chicago ..... | $ 1.49 | $ 1.46 | $1 .34 | $ 1.36 |
| Beams, Pittsburgh ..... | 1.30 | 1.26 | 1.20 | 1.175 |
| Beams, Philadelphia ..... | 1.509 | 1.359 | 1.359 | 1.30 |
| Tank plates, Pittsburgh..... | 1.30 | 1.22 | 1.125 | 1.16 |
| Tank plates, Chicago..... | 1.49 | 1.39 | 1.29 | 1.36 |
| Tank plates, Philadelphia..... | 1.509 | 1.359 | 1.359 | 1.30 |
| Sheets, blk., No. 28, Pbgh..... | 1.85 | 1.77 | 1.80 | 1.88 |
| Sheets, blue an., No. 10, Pbgh. | 1.35 | 1.35 | 1.35 | 1.375 |
| Sheets, galv., No. 28, Pbgh.... | 3.75 | 4.55 | 3.40 | 2.85 |
| Wire nails, Pittsburgh..... | 1.60 | 1.59 | 1.55 | 1.55 |
| Connellsville fur. coke contr... | 1.75 | 1.67 | 1.65 | 1.80 |
| Connellsville fdy. coke, contr... | 2.25 | 2.25 | 2.25 | 2.36 |
| Heavy melting steel, Pbgh..... | 14.00 | 11.75 | 11.75 | 11.50 |
| Heavy melting steel, east'n Pa.. | 13.75 | 12.00 | 11.31 | 10.50 |
| Heavy melting steel, Chgo..... | 11.50 | 10.15 | 9.25 | 9.50 |
| No. 1 wrought eastern Pa..... | 15.00 | 13.00 | 12.50 | 12.50 |
| No. 1 wrought, Chgo..... | 10.50 | 8.90 | 8.75 | 8.75 |
| Rerolling rails, Chgo..... | 12.25 | 10.00 | 10.00 | 11.25 |
| Car wheels, Chgo..... | 11.75 | 10.30 | 9.75 | 11.00 |

(For additional prices see page 374.)

# Pig Iron Market is Very Strong

### With Prices Steadily Advancing and Buyers Placing Orders Freely in All Leading Centers

Chicago, Aug. 17.—The market for all grades of pig iron, both northern and southern, in this district is strong and advances have been made the past week. Northern No. 2 foundry, malleable and basic are now established at a range from $13.50 to $14, Chicago furnace, for last half delivery and 50 cents higher is asked for first quarter shipment. Makers, however, are not anxious to quote after last half. It is expected that further advances will be made before the end of the week. Inquiries are being made from all directions and some fair tonnages have been closed the past week. The National Enameling & Stamping Co., St. Louis, has closed with Chicago furnaces against an inquiry for 5,000 to 8,000 tons of basic for first quarter delivery, the sale being made by a large dealer in Chicago at the prevailing level. A large sale of malleable iron was also made last week as well as 4,000 tons of other northern irons, the grades not being announced.

Lake Superior charcoal iron has been advanced 50 cents for last half delivery and $1 for first quarter. The minimum for this year is now established at $16.25, Chicago furnaces. The Power & Mining Machinery Co., Milwaukee, Wis., a subsidiary of the International Steam Pump Co., is inquiring for 5,500 tons of iron, of which 4,000 tons are for No. 1 for first half delivery, 1,000 tons of No. 1 for last half shipment and 500 tons of charcoal iron for first half.

Southern iron is ruling firm at $11, Birmingham, for prompt delivery and dealers are not quoting for shipment after the first of the year. Foundries are not inquiring actively, but large stocks which they had on hand are thought to be reduced considerably. This is an element in the strength of the southern pig iron market emphasized by the fact that furnaces are well sold up. One furnace is quoting $11.50 for prompt delivery.

#### Prices Being Determined

New York, Aug. 17.—Greater willingness of producers, especially in the Buffalo district, to name pig iron prices for next year's delivery, has resulted in the keeping up of an active though not extraordinarily heavy buying movement in metropolitan, New York State and New England zones. This development has tended to steady and to define the price limits of the future market. The common price for first quarter or first half shipment in the Buffalo district is $14, furnace, for No. 2X, equivalent to $15.84 to $16.10 at tidewater here and to $16.54 in New England. Early in the next year's selling movement some makers in the Buffalo district took orders at $13.50, furnace basis. Other makers are adjusting their schedules accordingly. For this year a variety of prices is being named, converging at about $15.25 to $15.50, tidewater for No. 2X, equivalent to $14.50 to $14.75, eastern Pennsylvania furnace. Virginia makers are quoting for this year $15.60 to $15.85, Jersey points, and $15.75 at interior New England. A leading central Pennsylvania maker has advanced to $13.75, furnace, for No. 2X for this year, $14.25 for first quarter and $14.75 for first half. Pennsylvania makers have made sales in New England for next year as high as $17, delivered, for No. 2X. This was before Buffalo makers began actively selling, however. The week's sales in this territory aggregated a large tonnage. Jersey buyers have been active for next year and in the Newark district alone 10,000 to 15,000 tons, a large part of which went to Buffalo, were closed. Five or six consumers there, including soil pipe and sanitary ware manufacturers, jobbing founders, etc., took 2,000 tons each,

(*For complete prices see page* 374)

and there were a number of smaller lots. A New York state equipment manufacturer is closing for 5,000 tons. There are other large inquiries in the market here, including one for 20,000 tons of mixed grades for next year's delivery to a consumer with a number of plants, some of which are in this territory; 10,000 to 15,000 tons of basic for first quarter or first half, for a New England buyer; 1,000 tons of high silicon and 500 to 1,000 tons of No. 2 plain to the General Electric Co. for shipment this year to Lynn, Mass. The recent rise in the iron market now has placed American iron on a level above English hematite and export business to the British Isles and to Italy has flattened out. The low stage of the exchange market also is discouraging export sales.

### All Grades Advance

Pittsburgh, Aug. 17.—Sharp price advances have featured a comparatively quiet pig iron market this week. Sellers of foundry and malleable irons, which were selling at $13.25, valley, a fortnight ago, have boosted prices for shipment the remainder of the year to $14.50, valley. While no large tonnages have been sold at that figure in the open market, yet consumers recognize the general asking price as representative. Gray forge iron is being held at $14, valley. Several of the more important puddling mill owners have been taking malleable and bessemer grades to meet rigid requirements of consumers. Several small lots of bessemer iron have been sold at $15.25, valley, and some dealers are asking $15.50, valley, for this grade. Standard basic appears to be well pegged at $14, valley, but some dealers are asking 50 cents a ton above that price and others are refusing to sell for either prompt or future shipment. During March, April and May of this year, bessemer iron sold at $13.60 and basic at $12.50, valley.

### Buffalo Sales 50,000 Tons

Buffalo, Aug. 17.—A stream of orders, unsolicited for the most part, coming into the Buffalo furnaces within the past 24 hours reached a total amounting to 40,000 to 50,000 tons for the week and caused prices to materially stiffen. Furnaces that had been asking $13.50 for foundry grades for early requirements and $14 for needs extending into first quarter of 1916, have advanced their prices to $14 as a minimum and for the time being are asking $15 as a maximum on the higher silicon grades and basic for last quarter requirements.

The advance has not curtailed the buying on the part of consumers. One melter who entered the Buffalo market for 2,000 tons of foundry iron for first quarter of 1916 sought to place the order at $13.50. After a canvass of the selling interests, $14 was found to be the lowest available price quoted prior to the advance that went into effect today. The result was an order for 3,000 tons placed at $14, showing that this consumer increased the anticipated requirement by 50 per cent.

Furnaces are not inviting buying into 1916 and are pretty well sold up for the remainder of the year. The demand for iron under contract is also increasing, shipments going forward in greater volume from the Buffalo stacks.

The marked increases in the demand for steel making iron is considered a strong factor in the situation now developing. More stacks are producing basic and bessemer irons, causing a corresponding reduction in the foundry irons productive capacity of the furnaces. Basic has reached $15 here, producing interests sold all the tonnage desired at $14.50 to $15.

The range of prices for fourth quarter delivery, f. o. b. furnaces, established this afternoon is as follows:

| | |
|---|---|
| No. 1 foundry | $14.50 to 15.00 |
| No. 2X foundry | 14.25 to 14.50 |
| No. 2 plain | 14.00 to 14.25 |
| No. 3 foundry | 14.00 |
| Gray forge | 14.00 |
| Malleable | 14.25 to 14.50 |
| Basic | 14.50 to 15.00 |
| Charcoal | 16.75 to 18.25 |
| Charcoal, special brands | 20.00 to 21.00 |

### Good Buying; Higher Prices

Philadelphia, Aug. 16. — A buying movement in pig iron begun vigorously in this and nearby territory a week ago, continues in force and is carrying prices to still higher levels. The business taken largely is for this year's shipment, as producers are feeling their way before naming prices to apply after Jan. 1. Consumers, however, are showing increasing anxiety to take on their requirements for the first quarter. Whenever producers open their books freely to 1916 orders, it seems assured under present conditions that it will be above the ruling market by a considerable margin.

Basic iron has gone up 25 cents further in the week. A 4,000-ton lot to a Coatesville buyer for November and December having brought $15.50, delivered. The total purchases by this buyer recently, thereby were increased to 14,000 tons. The last transaction in basic have been at a furnace equivalent of $14.75 to $14.85 to the seller. Makers now are asking $15, furnace, minimum, which means roughly $15.50 to $16, delivered. There is inquiry for next year which the furnaces are not acting upon. One buyer wants about 10,000 tons for first quarter on which he has offered $15.50, delivered, and another 30,000 to 35,000 tons. Another eastern buyer not in this territory asks 6,000 to 8,000 tons, first quarter. The N. & G. Taylor Co., which recently asked 3,000 tons of early basic, has closed. The establishment of a $15 furnace price on eastern basic, probably will be the signal for increased production. The Thomas Iron Co. is considering putting a furnace on this grade at such a figure. Foundry iron buying is fairly active, principally for this year. The Philadelphia market for this year is $15 to $15.50 for No. 2X, or about $14.75 to $15 Lehigh and Schuylkill valley furnace. Pipe works took about 5,000 tons of No. 2 plain and forge at $14, furnace, for spot and $14.25, for third quarter. Virginia iron is moving much better, one maker disposing of 8,000 tons for this year this week at $12.50 furnace for No. 2X, equivalent to $15.25, Philadelphia. Large stocks of iron are causing Virginia makers with some exception, to sell without advances. The Pennsylvania railroad inquiry for 3,500 to 4,000 tons remains open. Low phosphorus is strong. A sale of standard quality brought $22.62, delivered. Recent lots of eastern Pennsylvania iron, as noted, however, went at $21.50, Philadelphia. A lot of 3,000 tons was included in the week's sales. Lebanon makers, practically sold up for this year, have advanced again to $18 to $18.50, furnace, and have made small sales at $19.50, furnace. The Princess furnace in Virginia has gone in, Emaus soon will be in blast and one Crane and Temple may resume later.

### Inquiry is Active

Birmingham, Ala., Aug. 17.—For the first time in two months there is no development to report in the pig iron market for the week, quotations being strong at $11 for No. 2 foundry, Birmingham, for spot, $11.25 for last half delivery and $12.50 for first quarter delivery in 1916.

The finished market is reported stronger also. Practically all finishing mills in the district are now operating full capacity. Makers state they expect an advance in the 1916 first quarter quotation, believing that stocks are so low and the make for the remainder of the current year so closely sold that when the new year opens spot iron will be demanding as high as $14.

### Prices Slowly Advancing

Cincinnati, Aug. 16.—A local melter has bought between 4,000 and 5,000 tons of foundry iron for the last half, and a Michigan melter has closed for 600 tons of silvery iron for the same delivery. These are the important sales

*(For complete prices see page 374)*

made in this market during the past few days, although numerous smaller ones have been transacted, aggregating a fair tonnage. Prices are slowly growing stronger. Southern No. 2 foundry is quoted at from $11 to $11.50, Birmingham basis, for the last half, with the higher figure generally prevailing. It is expected that the market will be firm at $11.50, Birmingham, before the end of the present week. All but two southern furnaces have declared themselves to be out of the market. Offers to accept business for the first quarter at $12.50, Birmingham basis, are becoming more frequent, but it it not known that any orders have been placed at this price. Southern Ohio No. 2 foundry is quoted at from $13.75 to $14, Ironton basis, for the last half, and $14, Ironton, for the first quarter. No quotations are out on basic iron, as furnaces are well sold up to this grade. A few sales of silvery iron have been made at $16, furnace, for 8 per cent silicon, but today prices are stronger, and are quoted at from $16.50 to $17, furnace, for last half and first quarter delivery.

### Valley Prices Firmer

Youngstown, O., Aug. 17.—Pig iron buying is consistent and demand good. Some anxiety may be detected on the part of sellers in this district lest the market develop a "runaway" tendency, but to date the speculative fever has not attacked the trade. Merchant interests are not pressing sales and say that consumers have not been disposed to commit themselves for more than their normal requirements. While recent sales of No. 2 foundry, basic and malleable pig iron were made at $14.50 for delivery into next year, the stiffening of the market at Pittsburgh and Cleveland this week holds true in the valleys and $15 now represents the market for delivery in the first quarter of 1916. Likewise, the market price for these grades for this year's delivery now is $14.50, valley. Recent sales of bessemer pig iron were made at $15.25, valley, but the market now appears firm at $15.50. Gray forge is obtainable at $13.75, valley.

### Many Cleveland Sales

Cleveland, Aug. 17.—The pig iron market is very strong and Cleveland agencies have made sales which aggregate a large tonnage, although no individual sale was very large. In other words, many melters were represented in the transactions. In Cleveland the furnaces are quoting $14.50 for No. 2 foundry, basic and malleable, delivered in the city for the remainder of this year and $15.00 for delivery during the first half of next year. Prices in the Valley, at Toledo and Detroit are correspondingly strong and advances do not have the effect of checking buying. The present expectation is that quotations will advance to $15.50 at the furnaces for No. 2 foundry at a not far distant date.

Quotations on silveries have again been advanced and prevailing prices are now $16.50, Jackson, O., for 8 per cent silicon, for the remainder of this year and $17.00 for the first half of next year. Globe bessemer ferro-silicons are quoted on a basis of $19.50, furnace, for 10 per cent, for 1915 delivery.

Repairs are being made at Ella furnace at Pickands, Mather & Co., West Middlesex, Pa., but it has not yet been decided whether the furnace will be blown in. A report that Claire furnace, Sharpsville, Pa., which has been idle five years, is to be blown in is not officially confirmed. There is also doubt as to whether Fannie furnace at West Middlesex will be blown in in the near future. The second stack of the Toledo Furnace Co. is on malleable.

### Decided Improvement

St. Louis, Aug. 17.—The pig iron business is giving signs of decided improvement in this territory, both as to inquiry for iron and better prices. Two inquiries came out today, each for 2,000 tons of malleable iron, and sales the latter part of last week include 2,200 tons of southern No. 2, 750 tons of Lake Superior charcoal iron, and a number of small lots.

Some furnaces have withdrawn prices on southern No. 2, while others are quoting $11.50 to $11.75, f. o. b. Birmingham. Northern iron is held at $13.50, Chicago, and Ironton quotations have been withdrawn.

## Ferro Shipments

### Are Very Uncertain Owing to Attitude of English Government

New York, Aug. 17.—Considerable indefiniteness surrounds the current price situation in ferro-manganese. With English competition an uncertain factor because of the continued unwillingness of the British government to grant any further licenses for shipment to this country for the time being at least, the market largely is in the hands of the domestic producers. Agents of English makers still are willing to make sales at $100, seaboard, shipment to be made when it is possible and some buyers are willing to close for material on this rather indefinite basis. There are also a few surplus lots of English metal to be had upon which the usual price is $100, seaboard. It seems clear that domestic makers who a few weeks ago were willing to make concessions of $5 a ton or more, now are able to get better prices for their product. A sale of about 100 tons of metal slightly under the standard limits in manganese at $103, western Pennsylvania furnace, is noted.

No further light has been thrown upon the question when the British government will allow further shipments against contracts to come forward to this country. Advices from the producers received this week have remained inconclusive. It is learned that the plant of one of the English makers is shut down at present probably due to a shortage of manganese ore.

Domestic spiegeleisen has been more active and sales to home and foreign consumers within a few days have totaled at least 5,000 tons. Several thousand tons remain pending. Most of this metal is for this year's requirement. The prices of domestic spiegeleisen remain unchanged at $26. Eastern Pennsylvania furnace for 19 to 21 per cent.

### Special Irons Advance

Pittsburgh, Aug. 17.—Sellers of special irons at Pittsburgh have boosted quotations all along the line. Six to seven per cent silvery iron is held at a range from $15.50 to $16, furnace, or about $2 a ton above the market 60 days ago. Lake Superior charcoal iron is quoted at $15, furnace, for No. 2, or $1 a ton above the previously prevailing quotation. Bessemer ferrosilicon has been advanced 50 cents a ton this week, 10 to 11 per cent now being held at $19.50, furnace, for shipment this year. Demand for ferroalloys and special irons is heavy, largely as a result of the heavy volume of business enjoyed by manufacturers of munitions and high speed tool steels. The position of the market for ferro-manganese is not definitely established. Some resale material this week has been quoted at $110, seaboard, for prompt delivery. Supplies for tungsten are low and quotations as high as $3.25 a pound have appeared. The nominal price of this alloy has been $2.50. Vanadium is commanding $2.25 and above a pound of contained alloy. Nickel is quoted at 52 cents a pound by some interests; ferro-chrome is held at 20 cents a pound for high carbon and 40 cents a pound for low carbon analysis. Ferro-carbon titanium is listed at a spread from 8c to 12½c a pound. Prices for high speed tool steel continue to be advanced, quotations now running from 70 cents to $1.35 a pound, representing advances of about 70 per cent above quotations prevailing four months ago.

(*For complete prices see page* 374)

# Many Buildings Awarded

## July Was Best Month, Except One, in Sixteen Months —Leading Interests Advance Quotations

New York, Aug. 17.—July structural lettings in the United States reached the highest mark with one exception in a period of 16 months and amounted to approximately 148,000 tons, compared with about 138,000 tons in June. This tonnage represented a booking equivalent to 86 per cent of the total capacity of the bridge and structural shops of the country, according to the statistics compiled by the Bridge Builders and Structural Society. April, 1914, when 88 per cent of capacity, or 151,000 tons, were placed, was the only month since March, 1914, when the record of last month was eclipsed.

The statistics of structural awards, as compiled monthly by the Bridge Builders and Structural Society, are as follows:

| Month. | Per cent. | Approx. tonnage. |
|---|---|---|
| July, 1915 | 86 | 148,000 |
| June | 80 | 138,000 |
| May | 61 | 105,000 |
| April | 62½ | 107,500 |
| March | 64 | 110,000 |
| February | 30 | 51,000 |
| January | 25 | 43,000 |
| December, 1914 | 35 | 60,000 |
| November | 20 | 35,000 |
| October | 35 | 60,000 |
| September | 38½ | 65,000 |
| August | 27½ | 48,000 |
| July | 68 | 115,000 |
| June | 56½ | 95,000 |
| May | 57 | 97,000 |
| April | 88 | 151,000 |
| March | 76 | 130,000 |

General building activity in the metropolitan district continues to go forward along conservative lines and the steel tonnage arising is below normal. The capacity of fabricating shops in this territory, with some exceptions, is not very heavily engaged and this fact is demonstrated by continued sharp competition and low prices. Buyers of plain material are encountering increasing difficulties in getting shipments promptly and three to four weeks now seems a reasonable promise by makers. On current plain material business, which usually is of small lots, most makers now are quoting and obtaining 1.35c, Pittsburgh, or 1.419c, New York.

### Eastern Mills Heavily Filled

Philadelphia, Aug. 16.—In view of their heavily filled position, eastern Pennsylvania shape makers have put into effect a $1 a ton advance on current new business for third quarter and now are quoting 1.35c, Pittsburgh, or 1.509c, Philadelphia. One mill has gone further in this advance and is naming 1.40c for third quarter. The fourth quarter market remains closed. Specifications against contracts and other tonnage have been in such large amount that capacities are taxed and deliveries still fall behind. At present, they run from about one to four weeks depending on size and mill schedules. The situation promises to grow worse rather than better throughout the quarter. Buyers having limited stocks, have been offering premiums to obtain quick shipment, but have not been very successful. Offers to the mills of stock orders have excited little interest. Structural lettings still show a considerable number of both large and small requirements but medium-sized jobs are limited. Bids went in today in the first section of the Philadelphia subway, 7,000 tons.

### Shapes Quoted at 1.35c

Pittsburgh, Aug. 17.—The Carnegie Steel Co. yesterday notified its salesmen to quote 1.35c on shapes, plates and bars, and most independent mills have adopted that figure, which is $1 a ton above the previously prevailing quotation. Specifications for structural shapes gradually are increasing in volume and deliveries are deferred several weeks. Orders from railroads continue comparativly light, but fabricators are playing a more important part in the market.

### Shops Not Very Busy

Cleveland, Aug. 17.—The only structural contract of any size being considered in this district at the present time is one for about a thousand tons for additions to be made to the plant of the Valley Mold & Iron Co., Sharpsville, Pa. In spite of the fact that the price of shapes has been advanced along with plates and bars, structural shops are not very busy, and are bidding actively on the little new business that is developing. Hence some very low prices are being made on material erected.

### Decline in Galvanized

Youngstown, O., Aug. 17.—The sharp decline in spelter has brought about a corresponding drop in the price of galvanized sheets. In the past week this description has declined from 4.25c to 3.75c for No. 28 gage. However, the decline has not served to stimulate demand, for buyers have not forgotten the time when galvanized sheets were obtainable at 2.65c—in fact, some mills still are rolling on old contracts based on that price. Demand is even poorer than it was, if possible, consumers waiting for the bottom of the market.

Demand for blue annealed sheets is relatively better than for the other descriptions. A large proportion of this business is originating in the automobile trade. Makers believe a minimum of 1.40c, Pittsburgh, for No. 10 gage, cannot be shaded, and suggest that a range of 1.40c to 1.45c best represents the market.

Your representative noticed a car of spelter on a siding at a sheet mill today, and was informed that this car, bought at the recent high prices, represented a net loss of between $5,000 and $6,000, due to the falling market. Further, the zinc dross and scrap will be sold on a scale of the current market prices for spelter, so that the sheetmaker loses two ways.

Chicago, Aug. 17.—Shape prices show added strength and producers may soon follow those in the east and increase prices. In few instances the figure of 1.49c, Chicago, has been shaded, but these transactions have not been an important element in the situation. Smaller mills are filling up and when they have obtained tonnage sufficient to call for capacity operation, reduced levels will disappear entirely. Some fair sized lettings were awarded last week, totalling 6,553 tons. The largest award included 3,500 tons taken by the Morava Construction Co. for the Chicago & Western Indiana Railroad Co. for track elevation bridges in Chicago, and 1,250 tons by the Omaha Structural Steel Co. for the First National Bank building, Omaha.

### CONTRACTS AWARDED.

First National Bank building, Omaha, Neb., 1,250 tons, to Omaha Structural Steel Co.

Fourth National Bank building, Wichita, Kans., 293 tons.

Denver Union Terminal Co., passenger baggage and express subways, Denver, Col., 419 tons to American Bridge Co.

Presbyterian Hospital, Chicago, alterations and additions to Jones building, Chicago, 100 tons to Hansell-Elcock, Chicago.

Chicago, Great Western Railroad, three 70-foot through plate girder spans, 167 tons to American Bridge Co.

Chicago & Western Indiana R. R. Co., track elevation bridges, Chicago, 3,500 tons to Morava Construction Co.

Minnesota Steel Co., coke screening station for coke plant, New Duluth, Minn., 129 tons to American Bridge Co.

Chicago Surface Lines, girders and tie rods for Van Buren street tunnel, West End, Chicago, 309 tons to American Bridge Co.

Ticonic Investment Co., building, Milwaukee, Wis., 389 tons to Wagner Architectural Iron Works, Milwaukee, Wis.

Additional buildings for the New Jersey Zinc Co. at Franklin Furnace, N. J., about 600 tons, to the Guerber Engineering Co.

Work for the Public Service Corporation at Newark, N. J., 300 tons, to American Bridge Co.

Bridge for Boston & Maine railroad, 250 tons, to the Phoenix Bridge Co.

Pier No. 9, Hudson river, New York City, for the Central Railroad of New Jersey, 900 tons, Pennsylvania Steel Co., low bidder and expected to receive contract.

Immigration pier, Read street station, Phila-

(*For complete prices see page 374*)

delphia, for Pennsylvania railroad, 380 tons, general contract awarded to John M. Gill.

Friers' clubhouse, Forty-eighth street, New York City, 400 tons, to Geo. A. Just.

Work for Norcross Bros., Boston, 300 tons to American Bridge Co.

Infant Home and Mortuary, Our Lady of Victory R. C. Church, Buffalo, 300 tons to Progressive Steel Co., Buffalo.

Erie Malleable Iron Co., Erie, Pa., new foundry, 800 tons to Riter-Conley Mfg. Co., Pittsburgh.

Alterations to Herron avenue bridge, Pittsburgh, 150 tons, awarded to John Eichleay Jr., Co.

**CONTRACTS PENDING.**

Warehouse, Passaic, N. J., 500 tons, bids pending.

Superstructure for a pier at Twenty-ninth street, New York, 1,000 tons, bids to be taken Aug. 29.

Bridges in the east, 250 tons, for the Baltimore & Ohio railroad, bids pending.

Additional bridges for the Pennsylvania railroad, 600 tons, bids pending.

McCormick apartment house, Washington, D. C., 400 tons, bids being taken.

Pier shed for Pennsylvania railroad at Greenville, N. J., 2,200 tons, bids to be taken Aug. 23.

Extension of structural mill for Bethlehem Steel Co., South Bethlehem, Pa., several thousand tons, bids being taken.

Initial section of Philadelphia subway system, 8,000 tons, Keystone State Construction Co. low bidder on general contract.

Levy apartment, Eighty-first street and Park avenue, New York City, 600 tons, bids being taken.

Additions Valley Mold & Iron Co., Sharpsville, Pa., 1,000 tons.

# Sheet Prices

**Have Upward Tendency, But There Are Some Irregularities**

Philadelphia, Aug. 16.—With specifications being filed actively against contracts which take up almost the entire capacity of the mills for third quarter, eastern Pennsylvania sheet makers are not willing at present to sell for fourth quarter, and they want higher prices for the current lots which they can take on. They now are quoting 1.50c, Pittsburgh, or 1.659c, Philadelphia, for No. 10 gage blue annealed for current delivery. Some contracts for fourth quarter taken at the lower market some time ago form a backlog of business which it is not desired to increase at present. The reduction of $1 a ton to 40 cents per 100 pounds on finished steel, just announced by the American Hawaiian Steamship Co. for Pacific coast delivery through the Panama Canal is helpful to eastern sheet makers, though one other line recently had been making this rate.

**Galvanized Sheets Weak**

Cincinnati, Aug. 16.—The recent weakness in spelter has caused another slump in the price of galvanized sheets. They are quoted today at 3.75c, Pittsburgh basis, for nearby delivery, in comparison with from 4c to 5c, Pittsburgh, last week. The refusal of mills to sell for extended delivery has kept the tonnage of sales low. Black sheets are stationary, and have sold in only fair lots during the past two weeks. They are quoted at from 1.80c to 1.85c, Pittsburgh basis.

**Galvanized Are Weaker**

Chicago, Aug. 17.—Due to the decline in prices of spelter the galvanized sheet market in Chicago has weakened considerably. Demand is slight and some producers are offering No. 28 gage at 3.75c, Pittsburgh. It is not believed this market will improve until the price of spelter is more nearly normal than it is at present. Black sheets continue to be very strong and demand is fair. Mills continue to be deferred in deliveries. Prices on No. 28 gage range from 1.85c to 1.95c, Pittsburgh. The blue annealed sheet market is steady and prices are firm and unchanged. One fair sized tonnage of black sheets No. 28 gage is said to have been sold by a producer in this district at a figure considerably lower than the prevailing quotation.

**Fairly Active**

Cleveland, Aug. 17.—The sheet market is only fairly active and the strength of prices seems to be due fully as much to the high price of sheet bars as to the demand. On No. 10 blue annealed usual quotations range from 1.35c to 1.45c, Pittsburgh, but some makers are asking 1.50c. No. 28 black is quoted 1.85 to 1.90c. No. 28 galvanized is quoted at 4c.

**Galvanized Sheets Lower**

Pittsburgh, Aug. 17.—Declines registered by spelter the last few weeks have brought out lower prices for galvanized sheet products. Idle mill capacity rapidly is becoming engaged and some interests have offered several gages of galvanized sheets at prices equivalent to 3.50c, base. The general market, however, is quotable at a spread from 3.75c to 4.25c for No. 28 gage. Black sheets continue to gain strength gradually. Demand is described as brisk and it is not improbable material will be established on the basis of 1.90c for No. 28 gage this month. Blue annealed sheets are quoted at a spread from 1.35c to 1.50c for No. 10 gage, but the minimum figure rapidly is disappearing.

**Varying Demand**

Chicago, Aug. 17.—Inquiry for blue annealed sheets in this district is good, while that for black sheets is only moderate. One large independent producer is quoting the former, No. 10 gage, at 1.59c, Chicago, and No. 28 gage black sheets at 2.04c, Chicago. This maker has withdrawn from the galvanized sheet market.

**Tin Plate Quiet**

Pittsburgh, Aug. 17.—The tin plate market is seasonably quiet. Specifications are coming out in fairly good volume, but no new business of consequence is enjoyed. This material is nominally quoted at a spread of $3.10 to $3.20.

(*For complete prices see page* 374)

# Coke is Soft

**Continued Quiet Followed by Weakness n Quotations**

Pittsburgh, Aug. 17.—The Connellsville coke market not only continues quiet, but has reflected softness the last fortnight. Spot tonnages of furnace coke are selling at $1.50, ovens, and dealers have been unable to boost quotations for future shipment. The market for contract fuel nominally is quoted at $1.75, ovens; some dealers are asking as high as $2 a ton for shipment the remainder of the year. The market for foundry coke, in marked contrast with that for 48-hour fuel, is active and prices are somewhat stronger. Cupola melts gradually are being increased. Sellers of 72-hour fuel have experienced little difficulty in obtaining advanced quotations. Some interests are asking above $2.60, ovens, for both spot and contract delivery.

**Advance Expected**

Cincinnati, Aug. 16.—The coke market remains strong, and dealers are expecting an advance in furnace grades before the end of the month. A number of stacks that are contemplating blowing in will need new supplies of fuel, and some good tonnages are looked for from these sources in the near future. Shipments of both furnace and foundry grades on old contracts are up to expectations. Prices are stationary and strong in the Wise County, Pocahontas and New River districts.

**Contract for Furnace Coke**

New York, Aug. 17.—The Northern Iron Co. has closed for 6,500 tons of Connellsville furnace coke monthly for the rest of the year for its Port Henry furnace, which is about to resume operations. The price paid was $1.90, ovens. Quotations on furnace coke made to eastern consumers recently have ranged from $1.85 to $2, at the ovens, for this year's delivery. None of the makers has been willing to quote for next year.

The Canton Sheet Steel Co., Canton, O., is adding six additional hot mills to its plant.

# Clamor for Steel Bars

## Automobile Manufacturers Unable to Obtain Desired Deliveries—A Novel Proposition

New York, Aug. 17.—A new inquiry for 100,000 tons of shrapnel bars for one of the European nations at war has come before sellers in this district. Other large new inquiries for shell bars here are for 18,000 of 3-inch for 75-millimeter shells and another for 10,000 tons for France. The International Steam Pump Co. has been negotiating for 7,000 to 10,000 tons of rounds of shrapnel sizes. The Hall Switch & Signal Co., which has been figuring on 10,000 to 12,000 tons of bars, now is expected to buy forgings, probably 5,000 to 10,000 tons, although the details of this shell order have not yet been arranged. Prices on shell rounds are very strong, owing to the mills being heavily booked on such business, so that few of them can make early deliveries. There are more quotations over 3c, mill, than under at present. Some buyers have offered considerably more than this figure for quick delivery. On ordinary merchant bars, makers do not feel they can take on more new business, except in certain sizes and they are not pushing sales. Where they will quote, 1.35c, Pittsburgh, is generally asked, though 1.30c has not disappeared. Small sales have been made at 1.40c, Pittsburgh, in this district.

### Seek Full Mill Outputs

Philadelphia, Aug. 16.—The continuation of a tremendous demand for steel rounds for ammunition, rifles, etc., has lead to some tentative proposals being made by the manufacturers, to eastern Pennsylvania makers looking towards the taking over of all or a large part of the output of these mills for an extended period. This plan it is thought would offer advantages in the concentration of production, inspection, etc. Nothing can develop from it for the near future in eastern Pennsylvania, however, as the makers have their tonnage well engaged for some time. Many inquiries for rounds remain unsatisfied. The Westinghouse Electric & Mfg. Co. is seeking to duplicate a recent order for 4,000 tons of small sizes for rifle barrels. Nothing has been done with recent inquiries in this district for 115,000 tons, 24,000 tons, etc. Prices for large rounds are strong. On 400 tons, 3.00c, mill, was paid. The ordinary steel bar market presents no new features. No great effort is being made by makers to sell at present owing to their inability to deliver. Some mills are not soliciting at all. Others quote 1.30c and 1.35c, Pittsburgh, which are more or less nominal. There is no selling for fourth quarter. Specifications are good.

### Advanced to 1.35c

Pittsburgh, Aug. 17. — Most independent mills have followed the lead of the Carnegie Steel Co. in advancing prices of steel bars to 1.35c, Pittsburgh. Demand for rounds, particularly the larger sizes, continues decidedly heavy, with the bulk of the tonnage going to manufacturers of war material. Purely domestic demand for steel bars is satisfactory. Deliveries are deferred from 30 days to three months, according to size. Iron bars are held at 1.30c, Pittsburgh, although material of special analysis is bringing premiums ranging from $1 to $3 a ton.

### Prices Advanced

Buffalo, Aug. 17.—Prices were advanced to 1.35c, Pittsburgh, for immediate specification by the leading interest yesterday noon and the other mills and agencies of the district are inclined to follow suit. Indications point to a further advance within a month, not only in bars but in other lines. Consumers are coming in for their full quotas and in many cases specifying far in advance of their needs. Deliveries are becoming more extended. The export demand is on the increase and some mills, it is understood, are securing an advance of $1 per ton above the scheduled price for domestic business.

### Steel Bars Quiet

Chicago, Aug. 17.—While the market in this district for steel bars is quiet, the prices remain firm at 1.49c, Chicago, and mills are well filled. Some producers are predicting a further advance in prices. Deliveries continue to be deferred and inquiries are fair, specifications last week having been unusually large. Demand by railroads for this material for repairing purposes is increasing.

### Sales of Bar Iron

New York, Aug. 17.—Sales of bar iron have been made this week at 1.469c, New York, or 1.30c, Pittsburgh. This is higher than the usual market of eastern mills, which has been at 1.25c, Pittsburgh.

### Bar Iron Prices Firm

Chicago, Aug. 17.—The bar iron market in Chicago continues strong with the ruling quotation at 1.25c, Chicago. The higher prices of scrap material combined with the scarcity of steel bars has strengthened the bar iron market and producers are comfortably fixed for tonnage. The Republic Iron & Steel Co., whose mill at East Chicago was idle last week, resumed operations this week with enough orders on hand to assure operations for three weeks. Reports are heard of the 1.25c figure being shaded, but tonnages involved are small.

### Hoops, Bands, Shafting

Pittsburgh, Aug. 17.—Steel bands, in sympathy with steel bars, have advanced $1 a ton, now being quoted at 1.35c. Hoops are listed at 1.40c. Shafting manufacturers are enjoying a heavy volume of business and prevailing quotations are decidedly firm. Most shafting interests have enough orders on their books to assure activity the remainder of the year.

(*For complete prices see page* 374)

## Nuts, Bolts and Rivets

Pittsburgh, Aug. 17.—Advanced prices for nuts and bolts have been established firmly by makers in the Greater Pittsburgh district. Specifications show more snap and new inquiries involving heavier tonnages. It is not improbable rivet prices will be boosted within the next week or ten days.

## Loss of a Million Alleged

New York, Aug. 17.—Of considerable interest in connection with the heavy demand for war munitions in this country is a suit which just has been entered against the Hunter Arms Co., Fulton, N. Y., by Walter R. Hensey of 432 Fifth avenue, New York. Mr. Hensey, it is stated, since the European war broke out, has acted as an agent for the Westinghouse Electric & Mfg. Co. and the General Electric Co. in placing orders for war munitions through J. P. Morgan & Co. The petition in the suit alleges that an agreement was signed on June 24 whereby the Hunter Arms Co. was to sell its plant and equipment for $350,000 but that later on, when the Hunter Co. secured a Serbian war order, it refused to sell. The petition states that Mr. Hensey lost $1,000,000 in profits by not being able to fill orders he had taken.

Further contracts have been awarded by the New Jersey Zinc Co. for the construction of extensions to its zinc oxide plant at Millport, Pa. The improvements consist of a new furnace building, fan room, bag department, etc. The steel work is being furnished by the American Bridge Co., the Guerber Engineering Co. and the Phoenix Bridge Co.

# Plate Prices Advanced

## Leading Makers Move Up Quotations One Dollar, But Purchases Can Still Be Made at 1.25c

Philadelphia, Aug. 16. — All the leading eastern Pennsylvania makers of plates have advanced $1 a ton to 1.35c, Pittsburgh, or 1.509c, Philadelphia, for third quarter. Most of them do not care to quote for fourth quarter, but one important producer is asking 1.45c, Pittsburgh, for that period. Business has been taken at the new prices. Bookings are heavy and certain mills continue fairly swamped, so that their deliveries are at six weeks. Some buyers are not accepting very gracefully the extending of deliveries, and sales representatives are having trouble in satisfying some of their customers. The Cramp shipyard, which contracted to build another vessel as noted last week now has closed for a second boat. Both of these are tank vessels, one for the Sun Oil Co. and the other for the Union Oil Co. The 10,000 tons of steel for these boats will be divided between eastern and Pittsburgh mills. The Ward line has placed a merchant vessel with a Seattle yard and the Standard Oil Co. a tanker with the Union Iron Works, San Francisco. Two other ships are on the verge of closing with an eastern yard and many more remain in the market.

### Chicago Prices Are Stronger

Chicago, Aug. 17.—Demand for plates continues to be good and prices are strong. While the prevailing level is 1.30c, Pittsburgh, some business has been done the past week at 1.35c, Pittsburgh, a level which large producers are expecting to be established generally soon. Specifications are in excess of rollings.

### Some Irregularity

Cleveland, Aug. 17. — Although the plate market is strong there is considerable variation in quotations. Eastern Pennsylvania mills are quoting at 1.40c, while Pittsburgh mills are quoting from 1.30c to 1.35c and some mills in Ohio are still selling at 1.25c.

### Advanced a Dollar

Pittsburgh, Aug. 17. — The Carnegie Steel Co. under date of Aug. 16, advanced quotations for plates, shapes and bars $1 a ton, and is now asking 1.35c for all three products. Production records of finishing mills in July broke previous tonnage records for that month, according to several mill managers; indications are outputs this month will exceed those of last. Specifications for plates are coming out in fairly good volume, but new business is comparatively light. Reports of price irregularity in isolated sections of the east are heard. Most mills are unable to promise immediate shipment.

### More Boat Business

New York, Aug. 17.—A number of new boat propositions have come before eastern yards during the past few days and have increased the already long list of such matters now pending. It is stated that at least 10 vessels now are in an active stage of negotiations. One Atlantic yard is closing for two more vessels. A Baltimore yard is reported to have booked two 4,500-ton boats for Norway. All the eastern platemakers now are quoting 1.35c, Pittsburgh, or 1.41c, New York, for third quarter. Few of them can make prompt shipment and some of them have only limited tonnages unsold for third quarter.

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# Billet Sales

### Made at Higher Prices—Export Inquiries for Billets and Sheet Bars

Philadelphia, Aug. 16.—The eastern market in semi-finished steel remains at high figures owing to the general shortage of this product. One eastern Pennsylvania maker sold a good tonnage the past week of ordinary quality, re-rolling open-hearth steel at $31.50, mill, or about $33, Philadelphia. Small sales by other eastern makers were made at around $30, mill, such quantities being all that this producer can offer for this year. Forging billets usually are quoted by eastern makers at about $35, mill. Against such high prices, a buyer in this district claims to have taken about 1,000 tons of open-hearth re-rolling billets from an Ohio maker at less than $25, mill. This same buyer also took 1,500 tons of bessemer sheet bars from a Pittsburgh mill. Inquiry for semi-finished in this territory has been good. A Harrisburg consumer has asked for 5,000 tons of slabs for third quarter and an equal tonnage for fourth quarter. Export inquiries this week here totaled 7,000 tons of sheet bars and billets, but makers show little interest in such business, under present conditions.

### Open Hearth Material Scarce

Pittsburgh, Aug. 17.—With galvanizing departments of sheet mills becoming more fully engaged as a result of more normal spelter prices, the situation for open hearth sheet bars appears more acute. No sales have been made recently in the open market, but dealers are asking $25, Pittsburgh, for prompt delivery. A local steel mill, which recently inquired for 15,000 tons of bessemer billets, is understood to have purchased about 10,000 tons, paying as high as $23, Pittsburgh, for at least part of the material. Bessemer products gradually are advancing, but still are obtainable at about $1 a ton less than open hearth grades. Wire rods are held at $27 for domestic shipment; as high as $30 is being obtained for export tonnage.

### Filled for This Year

Youngstown, O., Aug. 17. — The semi-finished steel market gradually is accumulating more strength. Valley makers practically are filled up for the remainder of this year on contract work, especially in open hearth material, although an occasional tonnage of this still is obtainable. The bessemer situation is not so acute. All interests appear agreed that a prompt tonnage of open hearth sheet bars is not obtainable under $25, Youngstown, while other descriptions are correspondingly strong. Open hearth billets are held at $24, bessemer sheet bars at $24 and bessemer billets at $23. The leading valley interest is about sold up on wire rods, and holds this material at a nominal figure of $28, Youngstown.

### Italy Would Buy

New York, Aug. 17.—Italy has been showing strong interest in purchases of semi-finished steel and other re-rolling material in this country. This is said to be due partially to the fact that this country now is unable to draw accustomed supplies from the British Isles. Italy now is prospective buyer here of a large tonnage of ingots, 50,000 tons or more, but it is having difficulty to interest any of the mills on account of the strong pressure for crude steel. As already noted, that country has been buying all the crop ends and old steel rails it can obtain within a certain price range and recently it took another large lot of this material from an eastern tidewater works.

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The Driggs-Seabury Ordnance Corporation, Sharon, Pa., has sold to the Times Square Automobile Co., New York City, 500 tandem cars for shipment the next four months.

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The Northern Pacific railroad shops at Livington, Mont., are running at capacity for the first time since 1909.

(*For complete prices see page* 374)

# Scrap Advances Rapidly

## Heavy Melting Steel is Being Bid for Actively by Both Consumers and Dealers

Chicago, Aug. 17. — Sharp advances were made the past week in numerous grades of scrap material. Brokers are buying heavily in expectation of consumers coming into the market with increased demands. Heavy melting steel is quoted at the same levels, but sentimentally is stronger. Steel axles are being taken by users for consumption in open earth furnaces as a substitute for low phosphorous scrap owing to the scarcity of the latter material. Dealers who had large stocks of steel axles stored away have suddenly found they could be sold to be rerolled into rounds to fill the gap made by the unprecedented demand for steel rounds for shrapnel. While rerolled axles are not expected to come up to the specifications for shrapnel rounds they will serve to supply users of rounds for other purposes who find difficulty in obtaining their requirements through usual channels. Prices on this grade have jumped to $14 to $15.

The market is rather agitated so far as iron mill grades are concerned, due to the speculative activity of brokers. Not much demand exists, but the market is higher and it is finding levels more nearly in accordance with steel prices. Demand by consumers for most grades has increased and sales following them have resulted in a materially firmer market.

The Great Northern Railroad is offering 2,500 tons of the numerous grades f. o. b. cars St. Paul and Duluth, Minn., and Sioux City, Ia. Of this quantity 800 tons are No. 1 railroad wrought and 400 tons No. 2 railroad wrought. The Northern Pacific has issued a list offering 2,000 tons f. o. b. St. Paul and Minneapolis. Of this quantity, 635 tons are frogs and switching points. The Toledo, St. Louis & Western is offering 500 tons, of which 200 tons are cast iron car wheels delivered in places on its line free of charge.

### Higher Cleveland Prices.

Cleveland, Aug. 17.—Higher prices for practically all scrap feature the market. These advances are due rather to better sentiment than to any increase in mill buying. Sellers expect better demand for old material in line with pig iron and iron and steel products, and are disposed to hold their stocks for a rise. Brokers thus are between two mill stones, the upper being the reluctance of mills to buy at sharp advances over recent prices, especially as they covered their requirements for some time at those low prices, and the lower being the speculation for the rise that is going on in the market. Several dealers got "squeezed" by the recent sudden jump in prices. Heavy melting steel is quoted $11.75 to $12 a gross ton, Cleveland, and $12.50 to $13, Youngstown. Steel mills in this territory are taking shipments in good volume. Rolling mills still are buying sparingly.

### Firm at St. Louis

St. Louis, Aug. 17.—The local market remains decidedly firm, and the recent high level prices have been fairly well maintained. Relaying rails are scarce and in good demand. Heavy melting steel also is scarce, and sold this week as high as $12.25, delivered, in the local market. Railroad offerings this week are: Frisco, 150 tons; Great Northern, 2,600 tons; Missouri, Kansas & Texas, 1,200 tons, of which 150 tons are for No. 4 steel rails and 165 tons of No. 1 railroad wrought.

### Steel Scrap Strong

Cincinnati, Aug. 16. — Steel making scrap continues in active demand, and large tonnages are being shipped to rolling mills in this and Youngstown territories. Prices have not changed, but they are very strong on grades used in making open hearth steel and machine tool castings. Jobbing foundries, as a whole, are not as busy as they should be, and are buying very sparingly from hand to mouth. Stove foundries are dull, and are not making any purchases. Demand is best here for No. 1 machine cast, heavy melting steel, No. 1 busheling and bundled sheet scrap.

### Advance in East Rapid

Philadelphia, Aug. 16.—The rapidly advancing movement in old material prices in eastern Pennsylvania and vicinity still holds sway. The demand is broad and steady and as holders here tightened on the quantities they will sell, the market is being pushed up steadily. Heavy melting steel is being bid for actively by both consumers and the dealers or middlemen. This grade in good tonnage has been sold at upwards of $14, delivered to an eastern works, taking a freight practically the same as that to the eastern Pennsylvania mill district. Some special features characterized this transaction. Middlemen are offering up to $13.75, delivered, at various eastern Pennsylvania consuming points and the general market for steel seems at this figure as minimum. Sales of turnings at $10, delivered, of car wheels at $13.75, delivered, of shafting at $18, delivered, and of steel axles at over $18, delivered, are noted. For low phosphorus $16, delivered, is being bid. Italy has offered $21, delivered, for a tonnage of scrap steel rails, 5,000 tons or more, but this figure is not attractive to sellers. They want around $25, delivered, at about which figure some business recently was done with that country by an eastern steel works.

### Exporting Scrap

Buffalo, Aug. 17.—Old steel axles figured prominently in the Buffalo scrap market, owing to the extent of the orders booked and the fact that the buying was largely for export. Prices of old steel axles have advanced $1 a ton. Practically the entire local stock has been exhausted.

The demand for heavy melting steel in the Pittsburgh and valley districts has caused the price to stiffen 75 cents per ton, the bulk of the material sold here going to these sections. Old iron axles have also been advanced 50c per ton, not being in quite as strong demand as old steel axles.

There continues to be a light market for old car wheels, railroad malleable scrap and cast scrap, but dealers are looking for an increase in the volume of buying in these and the other lines. Further general advances in prices are looked for in a short time. Dealers are watching the stiffening attitude of the pig iron market and the increased activity of the mills and many of the foundries.

### Registers a Sharp Advance

Pittsburgh, Aug. 17.—The Carnegie Steel Co. has bought small tonnages of heavy melting steel in the open market, paying as high as $14 a ton, according to unofficial reports. Some heavy melting stock has sold at $14.50 and dealers express the belief the market will be established at $15 within the next few weeks. Other grades of old material reflect strength, and quotations have advanced from about 25 to 50 cents a ton. Low phosphorus scrap is decidedly strong, having commanded as high as $17 a ton in some instances.

### Market Excited

New York, Aug. 17.—A rather excitable condition continues in the old material market, which is completely dominated by sellers and some fancy prices are to be heard. Brokers are adding to the rather confused situation by speculative offers. Heavy melting steel, it is learned, has sold in some cases at over $14, delivered, to buyers,

(*For complete prices see page 374*)

and dealers have been offering $14, delivered, equivalent to about $12.40, New York. Steel axles have jumped sharply, sales having been made at over $18, delivered eastern Pennsylvania, and an offer much higher has been made. Wrought iron, equivalent to No. 1 railroad, has been sold at higher than $16, delivered. Small lots of wrought pipe have brought $13.50, delivered. Light iron has sold at $8.50, eastern Pennsylvania. The difficulty of buyers today is to get sufficient material to fill their requirements, as holders generally are bullish.

## Lake Ore

**Is Selling More Freely to Furnaces in the Central West**

Cleveland, Aug. 17.—There has been increased activity in the iron ore market during the past week due largely to furnaces in the central west which had not fully covered their requirements making contracts for additional tonnages. Sales of the past ten days have amounted to about 500,000 tons. Eastern furnaces are not showing much interest at the present time in lake ores. While some sellers still have considerable tonnages of Mesabi ores, both bessemer and non-bessemer, for sale, other firms report that their ores have been pretty well disposed of.

Decided improvement has taken place in vessel business and iron ore on the lakes which is now in better condition than it has been for two years. A Cleveland firm Tuesday made a contract to move between 600,000 and 800,000 tons of ore distributed among ten fleets.

## Engines for Australia

The Mesta Machine Co., Pittsburgh, has received an order from James B. Ladd, consulting engineer, Philadelphia, for a 1,500-horsepower mill engine for the Broken Hill Proprietaries Co., Ltd., New Castle, New South Wales, Australia. The engine is for rolling mill service and is of the heavy-duty tandem-compound corliss valve type. The cylinders are 30 inches and 54 inches in diameter and the stroke is 48 inches. This engine, when installed, will make the fourth unit built by the Mesta Machine Co. for the Broken Hill Proprietaries Co., three Mesta long-crosshead blowing engines, equipped with Mesta automatic plate valves (Iversen patent) having been shipped about two years ago.

The Seaman-Sleeth Co., Pittsburgh, builder of rolls, is shipping a large number of rolls to the Broken Hill Proprietaries Co., Australia.

## Rail Mills

**Are Busy Rolling Rounds—Shipments Made to Russia**

New York, Aug. 17.—The interesting situation referred to by *The Iron Trade Review* last week affecting deliveries of rails and track supplies to the railroads in connection with the enormous demand for large steel rounds for ammunition sales, is becoming more pronounced. In order to increase outputs three or four makers now are rolling large rounds on rail mills. Accordingly they are unable to make quick shipments of rails and track material to the railroads and furthermore the round business is at much more attractive prices than the former products. It is known that in the east orders for rails and track material for quick shipment within a week could not obtain a desired position with certain mills and were placed elsewhere. Rail deliveries to certain important systems are said to have fallen considerably behind. The roads which have been counting upon being accommodated with later rail orders, are likely to meet considerable difficulty in filling their needs.

Adjustment has now been made of the final details for the manufacture of that portion of the Russian rail order recently announced as having gone to the Cambria Steel Co. A large part of this order, as previously stated, has been redistributed by the Cambria Steel Co. to the Maryland Steel Co. and rolling now is under way. These rails are for shipment during the next several months. Supplemental orders for later delivery are expected to be placed with these and other mills. The contract to the Cambria Steel Co., in addition to the rails, calls for about 10,000 tons of angle bars, tie plates and other track material. Nothing has resulted from the recent offer of 20,000 tons of 67-pound rails for Russia to the Bethlehem Steel Co. The Lackawanna Steel Co., the Steel Corporation and other rail makers are negotiating for further lots of rails for Russia. Shipments of rail orders recently placed by Russia with the Lackawanna Steel Co. and the Steel Corporation, now are going forward actively. Shipments of a lot of 11,000 tons and two of 5,000 tons each from the Lackawanna Steel Co. for Vladivostok, were made this week from eastern ports and are to proceed by way of the Panama canal. The steamer Minnesota left Seattle Aug. 6 for Vladivostok, with 8,000 tons of Steel Corporation rails. These rails are for the Trans-Siberian railroad. The Illinois Steel Co. will supply the 6,000 tons of rails recently placed by the Chesapeake & Ohio. The Havana Central has asked for revised bids on its recent rail inquiry, which now has been reduced to 1,600 tons.

The outlook for equipment buying is a little more promising, but current contracts remain light. The New York Central lines have placed 500 all-steel automobile cars with the Haskell & Barker Car Co. and still is figuring on 1,000 cars or more. The Pressed Steel Car Co. has taken 50 mine cars for the Wyoming Coal Co., 18 flats for the Pittsburgh Crucible Steel Co. and 10 tank cars for the Tennessee Coal, Iron & Railroad Co. The American Locomotive Co. has taken orders for two locomotives from the South Dakota Central railway and one from the Wisconsin & Northern railroad.

**Would Purchase Cars**

The granting by the federal court to the receiver of the Wheeling & Lake Erie railroad of permission to sell $2,000,000 worth of receiver's certificates will mean the purchase of 850 new steel cars by the road, according to W. M. Duncan, receiver. The first lot of cars to be bought from the proceeds of the notes will include 650 steel drop-end gondolas, 100 standard steel automobile cars, and 100 standard steel box cars.

**Inquiry from France.**

The Pittsburgh foreign trades commission has received an inquiry for 5,835 freight and passenger cars, to be shipped via New York to Havre and Paris; drawings and specifications were sent out by Prince & Co., Paris.

## May Sublet Shell Order

Unless sufficient funds can be obtained to finance the purchase of additional shell-making machinery, probably half of a $2,400,000 contract for 500,000 French 75-millimeter high explosive shell-bodies will be sub-let by the Canadian branch of the Garland Stove Works Co., Hamilton, Ont. The order calls for 10,000 shells to be delivered in December, 1915, and 15,000 a month during January and February, 1916, the remainder to be delivered before Jan. 1, 1917, in equal monthly installments. Should the Garland company find itself unable to secure the necessary additional machinery, the portion of the order it cannot handle will probably go to a Cleveland factory.

Andrew Fletcher, of W. & A. Fletcher, Hoboken, N. J., has been made a director of the Submarine Boat Corporation, recently organized.

(*For complete prices see page 374*)

# Pipe Prices

**Are Reduced on Galvanized Product, Iron and Steel**

Pittsburgh, Aug. 17. — The National Tube Co. under date of Aug. 16, sent out revised discounts on galvanized pipe, showing reductions of $12 a ton on sizes ranging from one-eighth to 6 inches; larger sizes were reduced $8 a ton. Block pipe was not affected. The prevailing card on galvanized sizes up to and including 6 inches, is the same as that issued under date of June 1, when galvanized material was boosted five points or $10 a ton. Since Feb. 11, galvanized pipe has been advanced four times or about $26 a ton. Manufacturers of wrought iron pipe late yesterday made reductions for galvanized material similar to those announced by makers of steel pipe. General demand for tubular goods is fairly heavy, although no large inquiries, with the exception of one sent out by the J. G. White Corporation involving 210 miles of line pipe, is pending. Specifications for boiler tubes are light, but prices are described as firm.

## Less Than Ten Available

New York, Aug. 18. (By wire.)—The Steel Corporation still is putting on furnaces and is now running over 90 per cent of blast furnace capacity. Two South Chicago and one Joliet stacks have been started. The idle list contains about 20 stacks, of which less than 10 can be considered serviceable under present conditions.

## Important Plant Additions

So large has the business of the Standard Welding Co., of Cleveland, grown within the last few months that the company is rushing with all speed the construction of several large additions to its plant.

When the new additions are completed the Welding company's plant will cover a space of three large city blocks.

The first addition is practically completed. It is a brick building, 100 feet wide and 200 feet long, facing West Seventy-fourth street. This building is to be devoted entirely to the manufacture of bent tube parts, and makes this department of the Standard Welding Co. by far the largest of its kind in the world.

The second addition is to be of the mushroom reinforced concrete type. It will be built in the form of an L. One leg will extend 200 feet north and south on West Seventy-fourth street, the other left 240 feet east and west from West Seventy-third street to West Seventy-fourth street. The Seventy-third street section will be five stories. The fifth story will be finished off for general offices, recreation and dining room. The location of this building is ideal for the purpose, as the Standard Welding Co. overlooks Edgewater Park, one of Cleveland's most beautiful lake side resorts.

At a later date, two more additions will be built parallel to the Seventy-third street section and connecting with the main building. Double railroad sidings will enter between the sections, giving the Welding company fine shipping and receiving facilities.

# Valley Sales

**Made at Good Prices—Contract for Coke Plant Let**

Pittsburgh, Aug. 18. (By wire.)—Several small lots of foundry and malleable iron were sold yesterday at $14.50, valley, at which figure dealers have been holding both grades since last Saturday. One consumer has purchased 1,000 tons of No. 2 foundry at $14.50, valley, for shipment for the first half of next year. Some blast furnace managers are asking $15 for delivery after Jan. 1. It is reported that a small lot of bessemer has been sold at $16, valley, but the general market has not reached that figure.

La Belle Iron Works, Steubenville, O., yesterday awarded a contract to the Koppers Co., Pittsburgh, for 96 by-product coke ovens to be built on the West Virginia side of the Ohio river opposite the La Belle plant. The by-product plant will supply two blast furnaces with fuel.

## Active Demand for Cold Rolled Steel

Buffalo, Aug. 17.—The heavy demand on the mills and agencies for cold rolled steel is one of the features of the stiffening market. This demand is said to come largely from the manufacturers of automobiles and auto trucks in addition to the tonnages going into war materials. There is also an increase in the demand on the part of jobbers seeking to keep up their stocks. Reports indicate that most of the manufacturers of cold rolled steel products are working to their capacity and in many instances a 50 per cent increase in their output is reported.

The plant of Cowan & Britton, Ltd., of Gananoque, Ont., manufacturer of shelf hardware, has been purchased by the Canadian Steel Goods Co., of Hamilton, Ont. R. B. Britton will retain the management.

# Rate Controversy

**Settled for Railroads by Interested Commerce Commission**

Washington, Aug. 18. (By wire.)—The interstate commerce commission in the Sloss-Sheffield case holds that out of the original reductions in pig iron rates, the southern carriers should bear 23 cents and the northern carriers 12 cents. It finds that of the joint through rate to Chicago of $4, the lines south of Ohio should receive $2.52 and the lines north $1.48. All other joint through rates on pig iron from southern furnaces to points included in the Central Freight Association as well as those reduced in 1914 should be apportioned between carriers north and south of the river on the same basis as the Birmingham-Chicago rate. The carriers are ordered to establish by Sept. 20 rates to points in Central Freight Association territory not reduced in the first order, which shall be 35 cents per gross ton less than the rates in effect previous to Oct. 1, 1914.

## Quotations on Billets and Sheet Bars

Pittsburgh, Aug. 16.—Typographical errors caused *The Iron Trade Review* to give incorrect quotations on page 250 of the Aug. 5 issue on bessemer billets and bessemer sheet bars, Pittsburgh.

The following prices should have been quoted:

| | Prices Aug. 4, 1915. | Average for July, 1915. |
|---|---|---|
| Bessemer billets ..... | $23 | $21.40 |
| Bessemer sheet bars..... | 24 | 21.70 |

The prices on open hearth billets and open hearth sheet bars for the same periods, omitted from the table on page 250 were:

| | Prices Aug. 4, 1915. | Average for July, 1915. |
|---|---|---|
| Open hearth billets..... | $24 | $21.50 |
| Open hearth sheet bars... | 25 | 22.00 |

## Low Phos Higher

Philadelphia, Aug. 17. (By wire.)—Several thousand tons of low phosphorus have been sold at $22.50 and the market is strong at $22.50 to $23, delivered.

**A. F. A. Headquarters.**—The headquarters of the American Foundrymen's Association during the week of its convention at Atlantic City, Sept. 28 to Oct. 1 have been established at the Hotel Traymore in place of the Marlborough-Blenheim, which first was selected.

# Spelter Declines

**And Other Non-Ferrous Metals Are Marked Down**

New York, Aug. 17.—The metal markets during the week closing today have displayed a uniformly downward price tendency, which was most marked in copper and spelter. Yesterday it looked for a while as though the recession had about come to an end, but today prices again are lower. It is considered, however, that the market will turn shortly since it is known that there is a large volume of buying, particularly for export and on account of war orders, to be done. About the only actual business in the spelter market lately has been of a speculative character. Prime western is quoted nominally at 12c for spot and August, 11.50c to 12c for September, and 10.50c to 11c for last quarter shipment. Brass special has been sold at 13c for prompt shipment and offered at about 12.25c for last quarter.

Copper prices have declined on an exceedingly limited volume of business. Electrolytic is quoted at prices equivalent to 16.75c to 17c, delivered, 30 days; the cheaper grades of casting copper are to be had at 15.75c to 16c, cash, while prime lake copper is quoted in the outside market at 16.75c to 17c, cash.

Tin has been the exception. Last week a large amount of business was entered by importers. Since then, due partly to the effect of this buying and partly to declines in London, demand has fallen off. The market today is quoted at 34.50c to 34.75c, for spot and August, 33.50c for September, and 33.25c for October and beyond.

Following the last reduction in its lead price by the American Smelting & Refining Co. to 4.50c, New York, resellers have not been so eager to offer concessions. Today, however, these interests are offering at around 4.40c, New York, but without making many sales so far as known.

The antimony market is quiet and has declined in sympathy with the market as a whole. Some low prices are offered on spot Chinese and Japanese antimony and the market is somewhat between 31c and 32.50c, duty paid. Shipment from the far east is offered at 30c in bond.

## Spelter Production Increased

The production of spelter for the first six months of the year has been canvassed by C. E. Siebenthal, of the United States Geological Survey, with the following results expressed in short tons.

The output of spelter was 207,634 tons made from domestic ores and 8,898 tons from foreign ores, a total of 216,532 tons, as compared with 177,991 tons for the preceding six months, and with 175,058 tons for the first six months of 1914. In addition there was produced by distillation from drosses and skimmings 13,546 tons of secondary spelter, as compared with 10,273 tons, the half of the 1914 output of distilled secondary spelter. No statistics were obtained of the spelter produced by remelting skimmings, drosses, etc., but it was probably not less than 12,000 tons. The total output of spelter from both ore and skimmings was therefore about 242,000 tons, or at the rate of 484,000 tons per year. The whole number of retorts in operation in June was about 127,000, but many of these retorts had been but recently put in operation. Additional retorts to the number of over 32,000 have since been completed, are under construction, or are planned.

The apparent domestic consumption for the six months period was 160,906 tons, as against 149,762 tons in the preceding six months, and 149,306 tons in the first six months of 1914. The spelter stocks on hand at smelters were 5,884 tons, an average of about 150 tons each for the plants reporting.

The complete mid-year report giving the details of production, imports, exports, prices, and smelter capacity, will be distributed in about a week.

# Cast Iron Pipe

**Prices Pretty Well Maintained, But Demand is Irregular**

New York, Aug. 17.—While the tonnage of bookings by eastern cast iron pipe shops is being maintained on the whole, the territories from which this is being received vary considerably. Such a spasmodic condition is shown in the metropolitan district which, during June and July, was very active and orders were the heaviest in several years. Now the local market has subsided in activity and inquiries and bookings are light. The shops are maintaining prices very well. The usual levels are around $21.50, eastern Pennsylvania furnace, or $23, New York, for 6 to 12's and at $27.50, shop, or $29, New York, for 4's. R. D. Wood & Co. is the low bidder for 1,000 tons of 6 to 12's for Philadelphia, at $22.60, delivered, for the pipe and at $54.60, delivered, for the specials. The Donaldson Iron Works will supply 380 tons of principally 18's for a contractor's letting at Maywood, N. J. Dallas, Texas, is in the market for 3,500 tons of 3 to 42's; Hatfield, Pa., for 175 tons of 4 to 8's and Salem, N. J., is reviving a requirement of 500 tons of 8's. Bids were taken this week on 3,000 tons of 4 to 30's for Watervliet, N. Y. No action has been taken on the 4,000 tons for Caibarean, Cuba, recently inquired for by J. G. White & Co.

(*For complete prices see page* 374)

**Chicago Market Quiet**

Chicago, Aug. 17.—The cast iron pipe market in Chicago is quiet, but shops are in good shape because of yearly contracts placed with them. The city of Lincoln, Neb., is inquiring for 600 tons of 4 to 12-inch pipe; Chariton, Ia., will let awards on Aug. 24 for 450 tons of 4 to 10-inch pipe, and Maumee, O., will close on Aug. 25 for 800 tons of 4 to 14-inch pipe.

# Great Tonnages

**Of Barbed Wire Are Wanted Urgently for Export**

Cleveland, Aug. 17.—There is a tremendous demand for barbed wire for export and pending inquiries include one for 80,000 tons, one for 60,000 tons and a number ranging from five to 20,000 tons. In most cases, buyers are not particular about prices, but desire quick delivery and are promptly informed that it will be impossible to give delivery from mills before Jan. 1. In some cases it is understood that as high as 3.60c has been offered for prompt delivery.

It seems probable that if the greatly desired material is obtained, it will be necessary to buy it from jobbers at high prices. Prices on plain wire are being well maintained and an advance within a few weeks seems probable.

**Advance Expected**

Buffalo, Aug. 17.—The wire interests in this section indicate that a further advance in prices, amounting to $1 to $2 per ton, on wire and wire products is likely to take place in the near future.

**Wire Mills Continue Busy**

Pittsburgh, Aug. 17. — Wire manufacturers continue to enjoy a heavy volume of business, although purely domestic demand is seasonably quiet. Heavy tonnages continue to be exported to practically all quarters of the globe. Makers are asking $1.60 a keg for nails on new business, but shipments are being made against contracts placed on the basis of $1.55 a keg. It is not improbable extras for galvanizing will be reduced as the result of lower spelter prices. The galvanizing extra now is 80 cents per 100 pounds; that extra was adopted June 1.

The Goulds Mfg. Co., Seneca Falls, N. Y., manufacturer of centrifugal and reciprocating power pumps and hand pumps, has opened an office at 636 Oliver building, Pittsburgh.

# Money and Iron: Fact and Comment

## Most Industrial Stocks Make Gains—Interesting Report of the Thomas Iron Co.

THE news last week indicated that America's cornucopia is to be filled to overflowing by the products of the farms this year. The government reports indicated that nature is to do its full share to contribute to prosperity. The arrival from Europe of nearly $20,000,000 in gold and a large amount of American securities, which doubtless are to be used as security for loans to Great Britain, were further evidences that great prosperity is to be enjoyed by the United States. The week was one of advance in stocks until the close, when there were some declines on Saturday and several of the so-called war stocks such as American Locomotive preferred, Baldwin Locomotive preferred, the Bethlehem Steel closed the week at the same quotations as prevailed at the close of the preceding week.

The government crop report, which was made public Monday, indicated that the wheat crop will be 954,000,000 bushels, the largest ever raised by any country. Other estimates are 2,918,000,000 bushels of corn and 1,402,000,000 bushels of oats.

Sterling exchange broke badly Monday and caused more or less anxiety throughout the week. Tuesday there were indications of improvement in rail road stocks but it was rather peculiar that the largest gain was in Canadian-Pacific.

Thursday the market moved rather rapidly and Bethlehem preferred rose to 180 but closed at 165, a net gain of almost 14 points. American Car & Foundry, Willys - Overland, General Motors and Cast Iron Pipe also advanced. The bank of England reported a gold gain of $17,500,000 while the bank of France increased its gold holdings $20,000,000. It seems probable that these great banks are piling up reserves with the expectation of sending large amounts to America.

Sterling made a new low record Friday, when it was quoted at $4.70¾ for sight drafts. Report of cancellation of contracts for 2,000,000 bushels of wheat by Italian firms in Chicago resulted in a decline in the wheat market and some uneasiness in other directions. There was, however, nothing to indicate a general cancellation of contracts for munitions, which the belligerents need as badly now as at any time since war was declared.

Quotations at the close of business Aug. 7 and changes in leading stocks identified with the iron and steel industry are shown on the following table:

| | Close Aug. 14. | Net change. |
|---|---|---|
| American Brake Shoe & Fdy. Co., ctfs. | 106 | |
| American Brake Shoe & Fdy. Co. ctfs., prfd. | 178½ | + 3⅛ |
| American Can | 60 | + 1 |
| American Can prfd. | 106¼ | + ⅛ |
| American Car & Fdy Co. | 70¾ | + 8½ |
| American Car & Fdy. Co., prfd. | 117⅜ | + ⅜ |
| American Locomotove | 54⅜ | + 1⅜ |
| American Locomotive, prfd. | 98 | |
| American Steel Foundries | 44 | + 1⅛ |
| Baldwin Locomotive | 80¾ | + 1¾ |
| Baldwin Locomotive, prfd. | 106 | |
| Bethlehem Steel | 290 | |
| Bethlehem Steel, prfd. | 154 | +19 |
| Colorado Fuel & Iron | 41 | |
| Continental Can | 92½ | + 3¼ |
| Continental Can, prfd. | 103½ | + ½ |
| Crucible Steel | 72½ | —13 |
| Crucible Steel, prfd. | 102 | — ¾ |
| General Electric | 171½ | |
| International Harv. of N. J. | 106¼ | — 1¼ |
| International Harv. Corp. | 70 | |
| International Harv. Corp., prfd. | | |
| Nat'l Enamel'g & Stamp. Co. | 27⅞ | + ⅛ |
| Nat'l Enamel'g & Stamp. Co., prfd. | 88 | + 3½ |
| Pressed Steel Car | 63¾ | + 5⅛ |
| Pressed Steel Car, prfd. | 101 | + ⅞ |
| Pullman Palace Car | 162 | + 2 |
| Republic Iron & Steel | 43¾ | — ⅜ |
| Republic Iron & Steel, prfd. | 98¼ | + ¼ |
| U. S. Cast Iron Pipe & Fdy. | 20⅜ | + 2⅛ |
| U. S. Cast Iron Pipe & Fdy., prfd. | 47 | + 7 |
| United States Steel | 73⅜ | + 1½ |
| United States Steel, prfd. | 112¾ | + ⅛ |
| Westinghouse Mfg. | 112⅜ | + ¼ |

## Thomas Iron Co.'s Report

For the first time in the 61 years of its history, the Thomas Iron Co., Easton, Pa., has issued a printed report of its financial condition for the fiscal year ended June 30. President R. H. Sweetser paints a graphic picture of the serious business depression. He remarks to stockholders:

"During the 61 years of continuous corporate existence of the Thomas Iron Co., our country has seen several panics, and had two wars, but no period of depression has so deeply affected the iron business of the country as has the seven-year period just passed; and no one year has ever had more disastrous business conditions than the calendar year of 1914. The great and prolonged commercial depression was not confined to the Lehigh valley, nor was it limited to small independent iron and steel plants. It was general, and it affected every iron-making district in this country, and was even world-wide; big companies and little companies, even the United States Steel Corporation, passed dividends, and the annual reports of many iron and steel companies showed large losses. * * * The Thomas Iron Co. has passed through this period of great external disturbance and depression, and is now in better financial and physical condition than when it entered the two-year period beginning July 1, 1913."

The Thomas Iron Co. reports net income for the fiscal year of $37,901 as against a loss the previous year of $50,363. Income from dividends and bonds was $148,566, while returns from cinder sales, farm rents, ore sales, etc., increased the total income to $160,760. The company suffered a net loss of $46,654 on pig iron produced, while the reduction in the inventory of its iron stock was $4,605; the net loss from pig iron sold was $2,536. The expenses of inactive plants amounted to $69,063, which brought the total loss to $122,858. The difference between the total income from dividends and bond interest and the loss from manufacture was $37,901, which represents the net corporate income for the fiscal year. The income account follows:

| | |
|---|---|
| Revenue from cinder sales | $4,606 |
| Net revenue from farms | 415 |
| Net revenue from rents | 1,906 |
| Net revenue from ore sales | 3,582 |
| Revenue from labor, coal, etc. | 1,684 |
| *Total income from divs. and bonds | 148,566 |
| Gross income | $160,761 |
| Operating expenses of furnaces | $757,619 |
| Revenue from pig iron sales | 710,964 |
| Net loss from production | $46,654 |
| Reduction invent. stock iron | 4,605 |
| Net loss from stock iron sold | 2,536 |
| Total loss on pig iron sales | $53,795 |
| Expenses of inactive plants | 69,064 |
| Total losses | $122,858 |
| Net corporate income for year | $37,902 |

*Income from dividends Ironton R. R. Co., Catasaqua & Folelsville R. R. Co., Mount Hope Mineral R. R. Co., and Thomas R. R. Co.; income from interest on bonds of the Standard Cast Iron Pipe & Foundry Co. The income from bond interest amounted to $500.

## English Gold Received

New York, Aug. 16.—The largest single shipment of gold ever made to the United States and probably to any country, was delivered at New York, Aug. 11, by the Bank of England and amountted to $19,534,200. This great collection of wealth, which was in the form of gold coin, was dispatched to this country in order to support the exchange market in this country, which has been gradually declining, owing to the heavy unfavorable trade balance against Great Britain. The gold received,

however, has not effectively braced the rates of exchange which have continued on demand sterling from about $4.70 to $4.74¾. Further transfers of gold to this country from Great Britain, consequently, are expected. Since Jan. 1, the arrivals of gold from England at New York through Ottawa, Can., have amounted to $133,000,000. Included with the shipment of gold coin last week was a large quantity of securities for England, reported to exceed in value $10,000,000, which will be used later as a basis for loans here. The vessel carrying the gold coin and securities across the Atlantic is thought to have been a British battle cruiser.

## Resumes Dividend Payments

New York, Aug. 17.—Dividend payments have been resumed by the Republic Iron & Steel Co., the directors of which today declared a regular quarterly dividend of 1¼ per cent on preferred stock. On account of back dividends, the directors declared an extra dividend of ¼ per cent on preferred stock. In the latter part of 1914, regular dividends were omitted on account of the war, a total of 2¾ per cent being paid during that year. Twelve per cent is still due Republic stockholders on deferred dividends, and today's extra dividend indicates that the directors intend to pay this off in cash rather than in scrip.

## Barney & Smith Plan

Bondholders of the Barney & Smith Car Co., Dayton, O., have been approached relative to a new plan for lifting the receivership of the company without the sale and reorganization of the company previously proposed by the special committee. Clarence W. DeKnight, attorney of Washington, D. C., has asked options on bonds, proposing a loan of $1,500,000 be negotiated to provide the necessary working capital and lift the receivership. Mr. DeKnight conferred with financial interests relative to making the loan and they requested him to ascertain, as a condition precedent to determining the same, whether a substantial amount of the outstanding bonds can be acquired. They deem it important, he says, that in making such a loan they control a large proportion of the bonds. The lawyer asks the bondholders to give him a 60-day option on the holdings they have, stating their own price for the bonds. Of the $1,500,000 deemed necessary as working capital by the reorganization committee, stockholders have subscribed but $200,000 so far under the present plan, Mr. DeKnight says. Likewise the necessary 75 per cent of assents to the plan have not been received. The reorganization committee at its meeting on July 23 extended the time for depositing stock, filing assents and making subscriptions to Oct. 1.

## Allis-Chalmers Report

The report of the Allis-Chalmers Mfg. Co., Milwaukee, for the quarter ended June 30 shows sales billed averaged close to $1,000,000 a month, total sales being $2,816,181 for the three months. This compares with $2,017,712 in the first quarter of the year. Net profit on sales were at the rate of 4.7 per cent per annum on the $16,000,000 7 per cent preferred stock. Unfilled orders on hand June 30, last, were $7,657,185. At the end of March of this year business on hand was valued at $3,279,631. The statement of earnings in detail follows:

| | Sales billed. | Net profits. |
|---|---|---|
| April | $927,832 | $38,516 |
| May | 969,017 | 56,904 |
| June | 919,332 | 99,393 |
| Total | $2,816,181 | $194,813 |

## Financial Notes

The annual report of Steel & Radiation, Ltd., of Canada, shows profits for the year 1914 of $70,692, which after deducting interest, left a net profit of $13,797. This added to surplus on hand made a total of $104,041. Deducting a bond issue account of $6,892, the sum of $97,150 was carried forward. Net profits in 1913 were $108,131. The company suffered severely in 1914 from the falling off in building operations, but this year promises well as the result of large war contracts.

## Personal Mention

Edward H. Boyd has been appointed general superintendent of the Valley Mold & Iron Co., Sharpsville, Pa.

J. O. Hobby Jr. has been appointed treasurer of the American Locomotive Co., succeeding C. B. Denny.

Jonathan R. Jones, vice president and treasurer of the Alan Wood Iron & Steel Co., Philadelphia, has gone to Maine for five or six weeks' stay.

Marshall K. McCosh has been transferred from the Pittsburgh to the Cincinnati sales office of the American Sheet & Tin Plate Co.

H. E. Graham, general freight agent for the Pressed Steel Car Co., Pittsburgh, is in charge of a recently established traffic office of the company in New York City. F. M. Garland, Mr. Graham's assistant, will have charge of the Pittsburgh traffic office.

G. E. Elmendorf, a mechanical engineer formerly connected with the Lidgerwood Mfg. Co., New York, has accepted a position in charge of the hoisting engine sales department of the Cincinnati office of the E. A. Kinsey Co., central western representatives of the Lidgerwood company.

Cyril J. Bath, formerly manager of the Motch & Merryweather Machinery Co.'s second hand department, in Cleveland, announces the opening of offices in the Leader-News building, that city. He will deal in machine tools, specializing in used equipment. Mr. Bath has been identified with the machinery business for the past ten years.

Clarence A. Earl, vice president and general manager of the Hendee Mfg. Co., Springfield, is to become vice president and director of the Willys-Overland Co., Toledo, O., Oct. 1. Mr. Earl was connected with the Corbin Screw Co., New Britain, Conn., for over 20 years, later becoming first vice president of the American Hardware Corporation. He resigned this position to become vice president of the Hendee Mfg. Co. a year ago.

Morris Knowles, consulting engineer, has acquired the engineering business formerly conducted from offices in Pittsburgh, and Canton, O., by L. E. Chapin, recently deceased. Mr. Knowles, who was previously associated with Mr. Chapin, will conduct the combined business from his office, 2541 Oliver building, Pittsburgh, continuing to specialize in sanitary investigation and analyses, camp welfare, water and sewerage systems, flood prevention and town planning.

J. E. Ferguson, president of the Ferguson Steel & Iron Co., Buffalo, N. Y., recently enjoyed a one-half hour's frolic in the firmament with Beryl K. Kendrick, aviator, who has been entertaining visitors at Atlantic City this summer with his daring. "There was no peculiar sensation in ascending, dipping or descending in the air, but mother earth smiled very sweetly as she rose to meet us at the conclusion of our flight", Mr. Ferguson said shortly after stepping out of the machine.

Following the death of D. B. McClelland, vice president and treasurer of Spang, Chalfant & Co., Inc., Pittsburgh, several changes in the officers of the company have been made. George Matheson Jr. has been made vice president and will continue also as general manager; A. M. Bell, secretary, has been appointed secretary and treasurer; R. D. Morris, manager of sales in the Pittsburgh district, now is general manager of sales, and Boyd Watson has been made manager of sales in the Pittsburgh district.

Fig. 1—Effect of Tensile Strength Test on Highly Segregated Bar

# Making Sound Steel Commercially

## A Discussion of the Effect of Impurities and Methods of Eliminating Them—First of Two Articles

BY EDWARD F. KENNEY

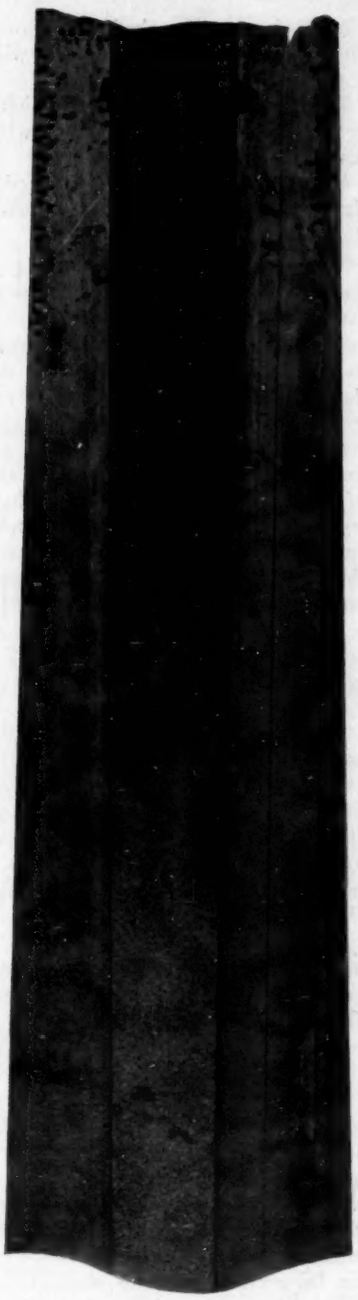

FIG. 2—NO. 1 INGOT HEAT NO. 28,560, WHICH WAS ALLOWED TO COOL AFTER CASTING

THE IDEAL steel is that which contains no break in the continuity of the metal, and in addition contains the same proportions in all its parts of all constituents which affect its strength or ductility. The lack of continuity appears in general in three forms, piping, blow holes and slag inclusions. The absence of the homogeneity referred to is the result of a segregation, due to liquidation, of the elements other than iron which are present in steel either from design or as impurities.

Of the first three objectionable features, the slag inclusions may be dismissed with the statement that they do not occur to any considerable extent in well-made steel, but the piping and blow holes are necessary evils, and one or the other will normally be present in a mass of solidified steel for the reason that the steel when solid occupies a smaller volume than when it was molten. As a mass of steel solidifies from the outside, this solidification of the outer steel approximately determines the shape and size of the mass. The molten interior continues to shrink as it cools, and unless the deficiency is taken up by bubbles of gas (blow-holes) forming in the interior, there will be a void due to the shrinkage. This shrinkage cavity is known as a pipe, and is distinguished from the other types of cavities referred to above as blow holes. These are bubbles of gas which were enmeshed in the solidifying metal, before they could release themselves and rise to the top of the metal. The refining of steel as carried on in the bessemer or open hearth processes is an oxidizing operation, and there is of necessity a considerable amount of oxygen present in the bath of metal, mostly combined with iron. There is

A paper presented at a recent meeting of the American Iron and Steel Institute. The author, Edward F. Kenney, is metallurgical engineer, Cambria Steel Co., Johnstown, Pa. A continuation of this paper in a subsequent issue will be accompanied by a discussion by Dr. Henry M. Howe, of Columbia University, New York.

FIG. 3—NO. 2 INGOT, HEAT NO. 28,560, HEATED TO ROLLING TEMPERATURE AND ALLOWED TO COOL

also present an appreciable amount of carbon, and a combination of the two elements produces gaseous compounds. This reaction takes place in all steels which have not been thoroughly deoxidized, and therefore all such steels contain gas bubbles or blow holes.

Carbon monoxide and other gases are more or less soluble in steel; the degree of solubility generally increasing with the temperature, and, therefore, considerable quantities of gas are thrown out of solution as the steel cools. Gas bubbles form in such quantity in a lively steel that the steel appears to boil quite violently in the molds; much of the gas evolved escapes, but some of the bubbles are held by the solidifying metal. The effect of these gas bubbles on the steel is dependent on their location. If they are close to the surface they are likely to result in surface flaws in the steel. The blow holes may so weaken the exterior of the ingot as to cause it to tear in the early passes of blooming, or by their being exposed due to oxidation of the skin of metal between them and the exterior of the ingot. When so exposed their surfaces are oxidized and they result in a large number of small seams unfitting the steel for many uses.

Some persons have considered as harmless the deeper-seated blow holes, but those, too, while much less objectionable than peripheral blow holes, often leave traces, after being welded up, in the shape of lower carbon areas which are weaker than the surrounding metal.

In crystallization from most solutions there is a selective freezing of the various substances in the order of their temperatures of solidification, and steel follows the general rule. Of the elements ordinarily present in steel, the degree with which they segregate is dependent on the variation of their qualities from those of iron. For instance, manganese, which is very similar to iron in atomic weight and other characteristics, segregates only to a slight degree, while sulphur, phosphorus and carbon, which differ widely in their nature from iron, segregate markedly. As the presence of some of these elements affects vitally the strength and ductility of the steel, the segregated portions are generally harder and less ductile than those not segregated, and this difference in physical qualities prevents the best results in resisting stresses produced in the steel in service. If we subject to simple tensile stress a bar of steel which is highly segregated, the difference in behavior of the hard center, rich in the metalloids as compared with the purer outside, is so marked that the ductility of the center will be exhausted, and failure will take place quite appreciably before similar failure takes place on the exterior. This effect is clearly indicated in Fig. 1, showing a section of steel rod which has been cold drawn. The center is highly segregated, as shown by the etching, and corroborated by analysis. In the severe distortion produced by drawing, its ductility has been exhausted, and internal fractures have occurred, although the exterior is apparently capable of yet greater elongation.

It appears quite evident that material so constituted is not fit for use in any important engineering structure, as the ordinary assumption that the stresses would be distributed and resisted uniformly by the entire section would not be true. On the contrary, the yielding of the more ductile portion concentrates the stresses on the less ductile, with the results shown in the illustration.

*Split Head Rail Failure*

A somewhat different development from the same cause is shown in the type of rail failure known commonly as a split head. In this case the exterior metal at the top of the head is distorted by the intense pressure on the area of contact with the wheel. This distortion results in lateral flow, but when the rail is segregated the hard interior metal does not possess sufficient ductility to permit its following the flow of the exterior, and an interior longitudinal fissure of progressive type results. This extends vertically through the head and longitudinally along the rail, and ultimately results in one side of the rail head breaking off, unless the failure is detected and the rail removed from service. This type of failure is found almost exclusively in segregated steel.

The growing use of heat treatment of steels for forgings is giving an added impetus to the movement toward securing uniformity in steels. The rapid cooling of the steel in quenching induces severe stresses. If these stresses are uniform and the resistance of the steel is uniform, the quenching can be done without damage to the steel; but if the hardeners which are affected by quenching are not uniformly distributed—if one part of the member being quenched has the hardeners in greater quantity in one portion, that portion will be subjected to greater stresses when quenched. These cooling stresses are frequently sufficient to crack steel which is segregated. Steel which requires to be heat-treated is generally treated only after a considerable amount has been expended on it in forging, and a failure after this expenditure is so costly that it will unquestionably pay to put a little more expense into the making of the steel, than to risk rejection of the more expensive forging, either from cracking in the quenching or from not meeting the required tests.

The general characteristics of segregation are fairly well known, though some of the causes are not so clearly understood, but the following statements will probably not be disputed:

1.—Segregation is greatest in the portion of the ingot which freezes last.

2.—It is most marked in elements whose characteristics differ most widely from those of iron.

3.—It is increased in steel which is lively, and decreased in steel which lies dead.

4.—It is greater in steel teemed at high temperatures than in steel teemed at more moderate heats.

The widely prevalent knowledge of the first of these statements has resulted in the application of cropping as the remedy, and there is little doubt that if we could be certain of knowing that there was steady progressive freezing by which the segregated metal, squeezed out of all other portions of the ingot by the solidification of the purer metal, was brought to some certain part of the ingot, we could get rid of the segregation in this way. Unfortunately, the type of ingot mostly used is so shaped that it is by no means certain that all the segregation occurs at the top of the ingot. This is illustrated in Figs. 2, 3, 4 and 5. The two ingots and two blooms were from the same heat of steel. The chemical survey of these shows quite clearly that in the process of freezing, bridges have formed in the ingots somewhat above the center and divided the molten metal into two pools, each freezing independently of the other. In addition to the principal center of segregation and shrinkage near the top, there has been a secondary one about half way down the ingot. The higher content of the metalloids at the bottom of the second bloom and top of the third, rolled from ingot No. 3, establishes this fact, and in the case of the blooms from ingot No. 4, a clearly defined shrinkage cavity was found in connection with the segregation. Instances of this kind are only too common in the ordinary type of ingots. If we wish to be certain that the segregation is at the top we must use ingots of the inverted type, or in some other way insure the progressive freezing from the bottom upwards, without the pos-

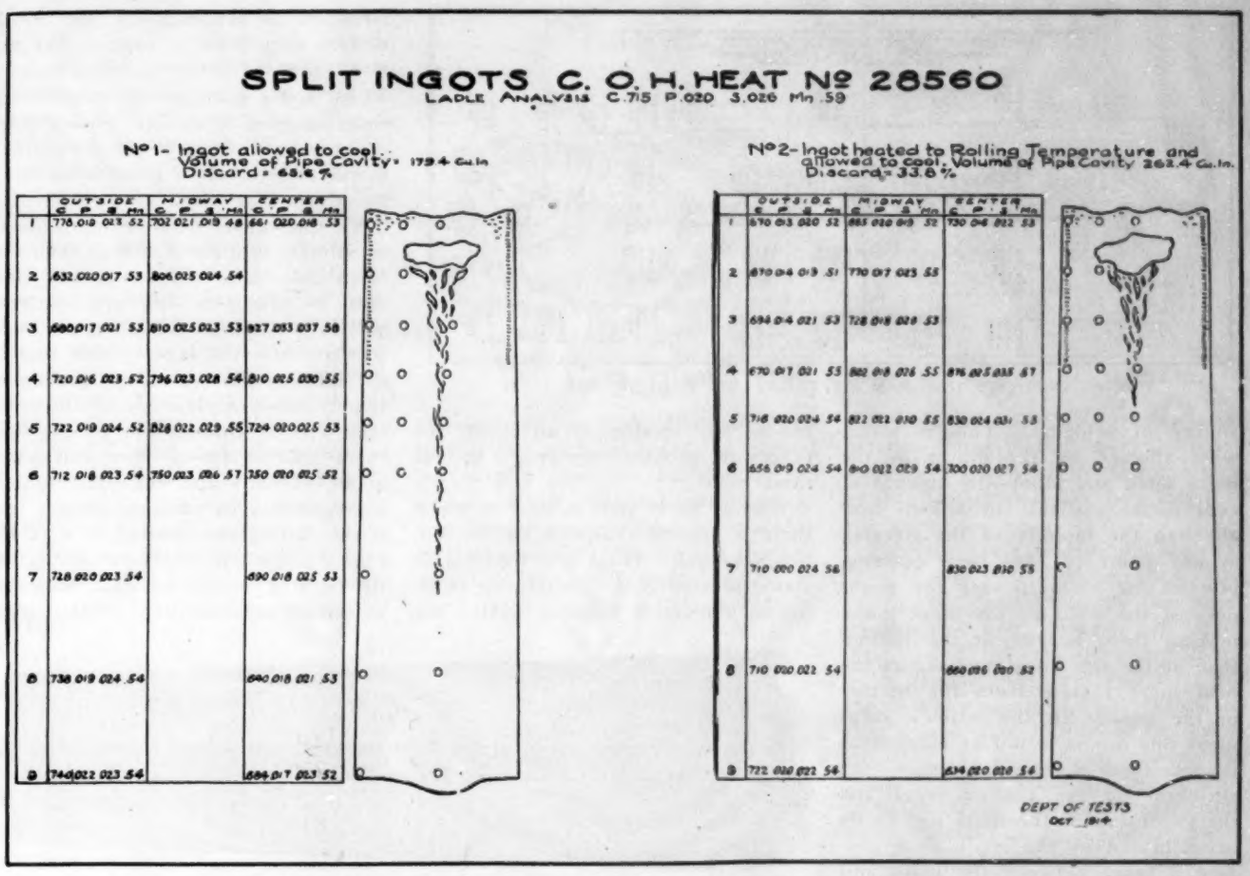
SPLIT INGOTS C. O. H. HEAT Nº 28560
LADLE ANALYSIS C.715 P.020 S.026 Mn .59
Nº1- Ingot allowed to cool. Volume of Pipe Cavity = 179.4 Cu.In. Discard = 68.6 %
Nº2- Ingot heated to Rolling Temperature and allowed to cool. Volume of Pipe Cavity 262.4 Cu.In. Discard = 33.6 %
OUTSIDE
MIDWAY
CENTER
DEPT OF TESTS
OCT 1914

FIG. 4—ANALYSIS OF SPLIT INGOTS C. O. H., HEAT NO. 28,560, SHOWING SEGREGATION

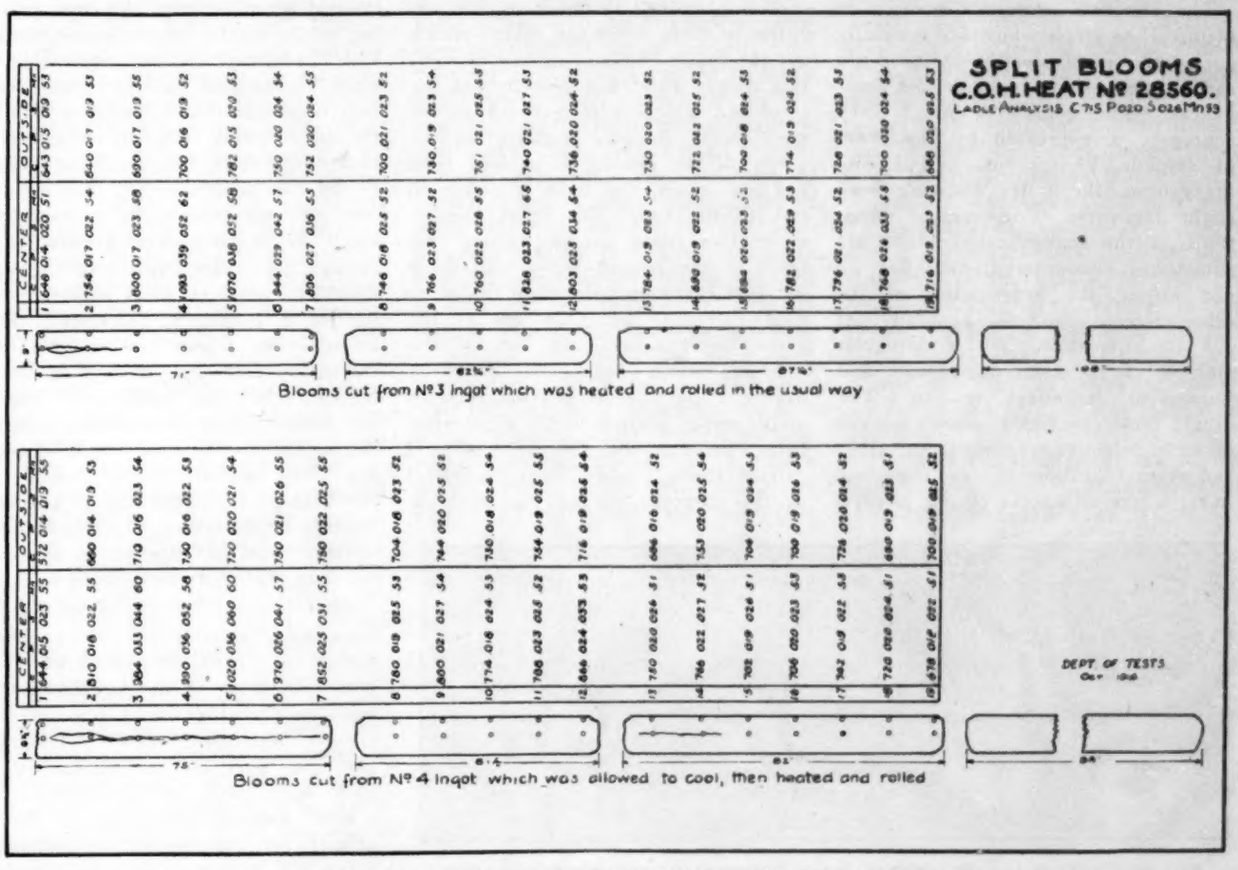
SPLIT BLOOMS
C.O.H. HEAT Nº 28560.
LADLE ANALYSIS C.715 P.020 S.026 Mn.59
Blooms cut from Nº3 ingot which was heated and rolled in the usual way
Blooms cut from Nº4 ingot which was allowed to cool, then heated and rolled
DEPT OF TESTS
Oct 1914

FIG. 5—ANALYSIS OF SPLIT BLOOMS, HEAT NO. 28,560

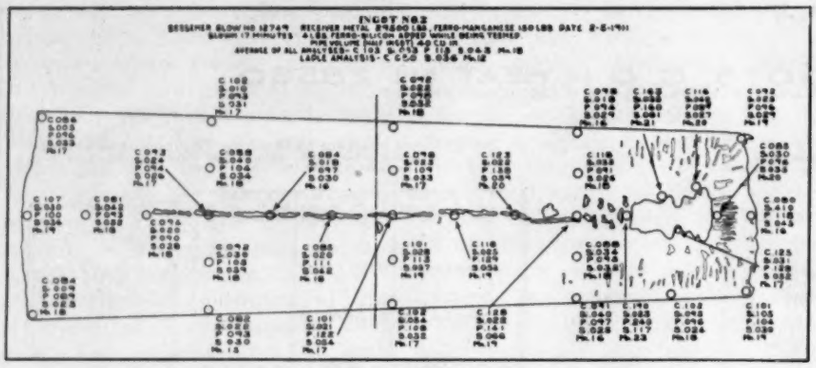

FIG. 6—ANALYSIS DIAGRAM OF INGOT NO. 2, BLOW NO. 12,749

sibility of bridging. This is somewhat affected by the design of the ingot mold and stool—the amount of cool metal available to absorb heat affecting the rapidity of the freezing at any point. It has been common practice for years to vary the thickness of the walls of the ingot mold, making them heavier at the bottom than at the top, so as to conduct the heat more rapidly from the bottom of the ingot. In the writer's judgment this means is not as efficient as is sometimes expected, because the shrinkage of the cooling ingot and the expansion of the mold due to its being heated by the ingot, soon produce a space between the ingot and mold. This space is filled with air which is a poor conductor.

The elements ordinarily present in plain carbon steels which are generally considered as of most importance are carbon, phosphorus, sulphur and manganese. The degree in which they segregate is expressed by the order of sulphur, phosphorus, carbon and manganese, the latter showing very slight tendency. Considerable variations in the manganese content are sometimes encountered, but they do not follow the segregation of the other elements, and are generally not due to liquidation, but to irregular melting of the ferro-manganese, and consequent imperfect mixing. The other three elements show marked effect of selective freezing in the steel, and seem to follow the same general lines; where an excess of one is present in any locality in an ingot, the others are probably segregated at that same point.

Wild or lively steel is steel in which there is marked ebullition due to evolution of gas. These gas bubbles, as stated previously, are largely the product of a reaction between oxides and carbon contained in the steel. In addition to these there are others which are the result of throwing out of solution of gas which has been held in the steel and which is thrown off as the steel cools. Because of the great disparity of the density of molten steel and the gases, the bubbles strive to rise to the top. The great number of bubbles rising produce active currents in the molten ingot, and these currents carry up with them the more fluid segregate which is left as the purer metal crystallizes out in the freezing. This segregated material, having a low specific gravity, remains at the upper portion of the ingot after being collected by the currents and carried there. Aside from the effect of the currents referred to, there is considerable tendency of the metal rich in impurities, to rise to the top due to this lower specific gravity. Killed steels contain only small quantities of gas; there are consequently no very active currents in the cooling metal, and therefore it solidifies more quickly and is much more uniform.

As the capacity for holding gases in solution is greater at high temperatures than low, it follows that steel cast at relatively low temperatures will, other things being equal, carry less gas into the ingot molds than if the same steel were cast at higher temperature. As less gas is contained, less will be thrown out of solution, there will be fewer blow holes, less active currents and consequently less segregation. In addition to this, the lower casting temperature reduces the time occupied in cooling the steel to its freezing point, and this reduction of the active time of freezing reduces the tendency toward selective freezing of the steel's various constituents. The minimizing of the tendency toward segregation can be effected in two ways—thermally and chemically, the latter being much more effective than the former, but the combination of the two producing the best results. The thermal remedy is teeming the steel at a temperature just high enough to insure clean pouring and avoiding excessive skull in ladle, and danger of freezing up the nozzle. This lessens the range of temperature through which the steel must cool before solidifying, and also lessens the differential of temperature between the various parts of the ingot in cooling. The further thermal remedy of rapid cooling of the ingots involves other considerations which would be uneconomical in commercial practice, so that we will not consider them.

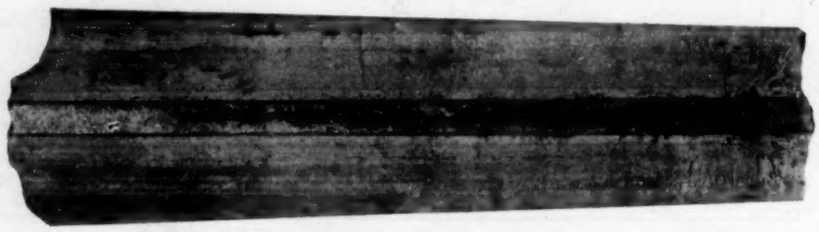

FIG. 7—INGOT NO. 2, BLOW NO. 12,749, SPLIT

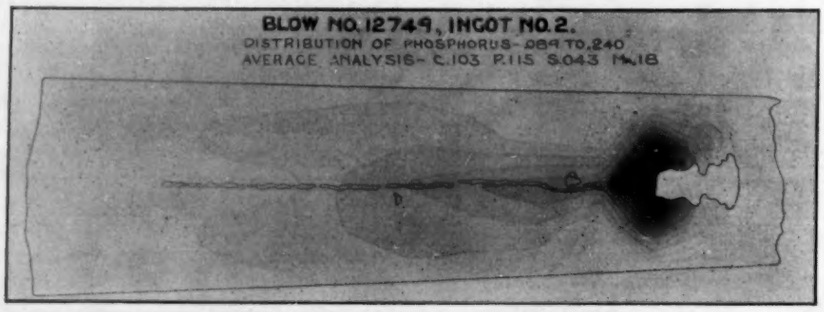


FIG. 8—INGOT NO. 2, BLOW NO. 12,749, DISTRIBUTION OF PHOSPHORUS, 0.089 to 0.240 PER CENT

The chemical remedy is simply deoxidation; removing the principal source of the production of gas bubbles. If there is no oxygen in the steel to combine with the carbon, carbon monoxide, which plays the principal part in the formation of blow holes, will not be formed.

Any substance having a strong affinity for oxygen at high temperatures, and whose oxide is not gaseous, could be used, but that which pro-

duces an oxide capable of being slagged off and separated by gravitation would be preferred. The elements generally used for this purpose are silicon, aluminum and titanium.

The action of a deoxidizer in ingots of ordinary rising steel is shown by a study of the photographs of the two split ingots from a low carbon bessemer heat which are shown in Figs. 6 to 11. Both of the ingots are from the same heat and differ in treatment only in the amount of ferro-silicon which was added in the mold, and the part of the ingot to which it was added. The steel boiled in the mold, and when ingot No. 3 was about half teemed there was a marked evolution of gas which caused it to rise rapidly. This rising took place to such an extent that when about three-fourths of the ingot had been teemed the steel had frothed up nearly to the top. The addition of a very small amount of 50 per cent ferro-silicon which had been finely ground, caused the steel to subside rapidly, leaving only a thin shell on the outer walls, which showed the height to which the steel had risen. The effect of this small addition extended a little more than half way down the ingot, the portion not affected being plainly marked by a zone of peripheral blow holes fairly close to the surface. The upper portion which solidified simultaneously with the zone containing the peripheral blow holes is quite solid. Under normal conditions blow holes will occur in the upper portion of the ingot to a greater degree than the lower, due to the greater ferrostatic pressure in the lower part of the ingot discouraging the evolution of gas, just as the carbonic acid in a bottle of soda water, which is held in a solution when under pressure, is given off when the pressure is reduced. The prevention of peripheral blow holes in the upper portion by the action of the ferro-silicon is, therefore, the more marked because the natural tendency is exactly reversed. Deeper in from the surface of this ingot there is a line of blow holes which are caused by the evolution of gas from the steel later on in the cooling history of the ingot, after the effect of the small amount of ferro-silicon has been dissipated, and in this line of blow holes the normal tendency of the gas bubbles to become smaller and less numerous as the ferro-static pressure increases is clearly shown. In this ingot there is no sign of a shrinkage cavity or pipe. In ingot No. 2 four pounds of ground ferro-silicon were added gradually as the teeming proceeded. This was sufficient to almost entirely prevent the evolution of gas, as no blow holes are present, except in the extreme top of the ingot where the pressure was so low that the small amount of gas in solution was sufficient to overcome it and permit the bubbles to form. The absence of the gas bubbles has caused such a shrinkage in the space occupied by the interior metal that we have very strongly marked piping extending, as is sometimes the case in killed soft steel, nearly the entire length of the ingot. This tendency may be due to the soft steel, because of its higher melting point, becoming pasty at a much higher temperature than steels of higher carbon, and the increased shrinkage through the greater temperature range tearing apart the pasty steel in the axis of the ingot, which at that temperature has very low tensile strength.

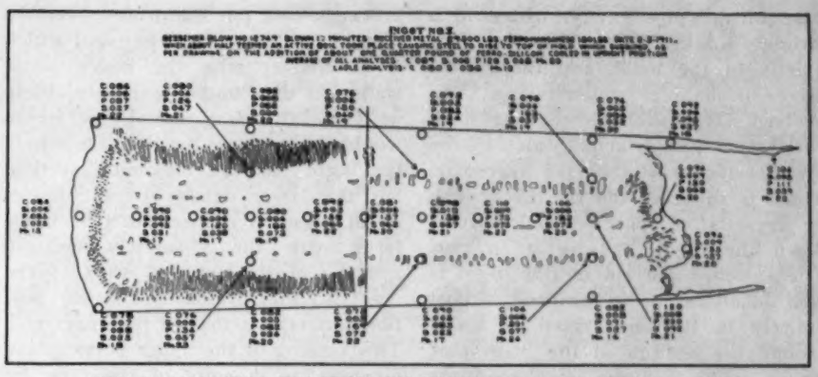

FIG. 9—ANALYSIS DIAGRAM OF INGOT NO. 3, BLOW NO. 12,749

FIG. 10—INGOT NO. 3, BLOW NO. 12,749, SPLIT

To show the extent of the segregation of the impurities in these two ingots the distribution of the phosphorus has been plotted. In ingot No. 3, Fig. 10, the peripheral blow holes around the lower half have retarded the cooling of that portion, so that a pool of molten metal has existed after the central part above the protecting blow holes has frozen. This is indicated by the local segregation in the lower part of the ingot where the degree of enrichment is nearly as great as in the larger segregated area at the normal location in the upper part of the ingot. It is also noteworthy that there is a decided difference in the degree of the enrichment of the two sides of the ingot, the portion extending along the line of interior blow holes on the right-hand side of the illustration being much more highly segregated than the corresponding location on the left side. The protuberance on top of the ingot immediately over this line of blow holes points the reason for the peculiarity. This protuberance is the growth caused by the metal brought up by the current of gas bubbles and shows that the principal ascending current of gas bubbles was located at this point.

The phosphorus chart of the second ingot, Fig. 8, indicates that there was very little segregation except at the

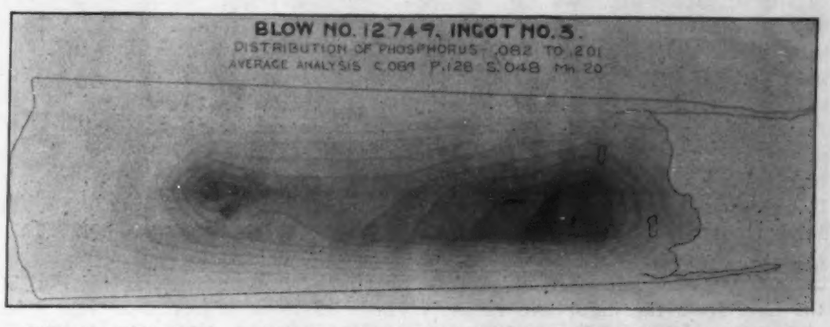


FIG. 11—INGOT NO. 3, BLOW NO. 12,749, DISTRIBUTION OF PHOSPHORUS, 0.082 to 0.201 PER CENT

base of the pipe cavity, where it is strongly marked. This ingot lay very quietly in the mold, and there were no considerable amounts of gas evolved. It is probable that the local enrichment was principally due to the low specific gravity of the segregate, which is squeezed out by the growth of crystals of purer metal further down the ingot, causing it to rise. The enriched portion in this ingot is well localized, being confined almost entirely in the small pool of metal around the bottom of the main pipe cavity. The addition of deoxidizers to the steel in the mold, as carried out in these experiments, is not recommended practice, but is used only as a convenient illustration of the action of such deoxidation.

It is preferable to have all reactions completed before the steel is teemed. As far as possible, deoxidation should be carried out in the furnace. It is not always practicable to complete it at this point, and further deoxidation in the ladle is not objectionable, but the least desirable point in the practice of making and pouring steel, to add such deoxidizers, is in the ingot molds, as the non-metallic products of the reaction do not have the same opportunity to separate from the metal as in the furnace or the ladle.

*Piping*

Care in making and pouring the steel and thorough deoxidation can be depended on to minimize segregation to such a degree as to remove all apprehension as to any serious detriment due to it, but in carrying out these remedies in connection with the ordinary practice, we have introduced an element which is just as objectionable. This is the internal shrinkage cavity or "pipe". This much misused word properly applies to the cavity left in the interior of a casting or ingot by reason of the cold metal occupying less space than the same amount of metal while hot, and the shape and size of the cavity will be dependent on the shape of the ingot, the temperature and speed of casting and the relative speed of cooling of the various parts. While various types of special ingots are used for special work, there seems to be one general type which is in almost universal use in the large steel plants. Probably 98 per cent of the steel made in the United States today is cast into ingots of one general shape. These ingots have a taper of about ¼-inch to ½-inch per foot of length, the top being materially smaller in section than the base. The ingot mold walls are made heavy to quickly absorb the heat from the ingot and cause it to freeze rapidly, and the solidification proceeds with fair uniformity over the part of the exterior of the ingot which is in contact with the heavy metal walls. If the cooling were absolutely uniform, the last metal to freeze would be toward the bottom where the ingot has the maximum section, but the lesser density of the hotter metal causes it to rise and thus interferes with the absolutely uniform freezing of the exterior walls of the ingot, so that ordinarily the last portion to freeze is toward the upper end. This cooling of the upper portion last, however, is in spite of the taper of the ingot, and too frequently the effect of the taper and the tendency of the hottest metal to seek the top of the freezing ingot interfere with one another to such an extent that the freezing metal bridges from one side to the other, and prevents the lighter portions of the molten metal from rising to the top. A pool of molten metal below such a bridge acts as a center of shrinkage and segregation. As it cools and solidifies, it shrinks and, its volume being less, a shrinkage cavity results. The bridge very effectually prevents the void being filled by liquid metal from above, and we have a pipe existing at a point where no well-behaved pipe should be, so far down the ingot that ordinary discard would not remove it. This has already been referred to in connection with ingot No. 4 in Fig. 5. The pipe is about 50 per cent from the top of the ingot, and analyses show that there is marked segregation of impurities in the neighborhood. Both of these features are due to the bridging of the metal above and the formation of a separate pool during the freezing of the ingot.

Unfortunately, this is not an infrequent occurrence; the tendency is always present in an ingot which tapers toward the top, and even where actual piping does not develop there is frequently present a loose spongy structure which, in the opinion of the writer, is responsible for many of the unexplained failures of steel in service.

Even where bridging has not developed sufficiently to break the interior of the ingot into separate pools, the tendency of the upward tapering ingot to pipe deeply is so marked that any effort on the part of the steelmaker to thoroughly deoxidize his heats results in such deep piping, and therefore necessity for so much top crop, that the practice is regarded as not being commercial. This effect of the taper of the ingot on the depth of the pipe is very clearly seen by comparing ingots No. 2 and No. 4 in Fig. 12. Both of these ingots were cast from the same heat, which was of strongly piping character, and were subjected to identical conditions so that the only variable is the shape of the ingot. The taper is the same in both, but in one case the top is small, and in the other the top is larger. In the first case the pipe cavity extends 28.6 per cent from the top, and in the other 58.4 per cent. In the one case 71.4 per cent of the ingot is available for product, while in the other little more than half of that amount or 41.6 per cent is product.

The inverted ingot is highly efficient in preventing the occurrence of irregularly located pipes and segregated areas. In that type of ingot, the solidification is always progressive from the bottom upwards; the last metal to freeze is always at the upper portion of the ingot, and bridging is practically eliminated. Consequently, when we crop off all the piped portion from the top we can feel assured that we have left only solid steel. Such assurance we never have or can have with the upward tapering ingot. The difficulty with the larged topped ingot is that its greater top section means a greater amount of metal discarded for each inch of depth to which the pipe extends, and yet such greater section is what has insured us the progressive upward solidification which is so essential.

*Keeping the Top Hot*

To avoid this heavy discard there must be provided some method of keeping a small body of metal at the top of the ingot fluid until all the lower portion has solidified. For this purpose many expedients have been suggested, which are of two general classes: (1) Means for adding heat, and (2), means for conserving the heat already in the molten steel. Under the first head the following methods have been used: (a) Application of electrically generated heat to the top of the ingot; (b) application of heat from gas or oil burners on the top of the ingot; (c) addition of carbonaceous material, such as coke, charcoal, etc., to the top of the ingot. This is ignited by the heat of the metal. In some cases a blast of air is used to assist in the combustion of the fuel.

The second means comprises the use of tops made of heat insulating material placed on the ingot molds and filled with the molten metal. Because of the non-conducting character of the top, the metal enclosed is kept fluid longer than that in the body of the ingot.

It is quite evident that the efficiency of the non-conducting top will determine whether or not external heat is necessary. If a top can be obtained

which will keep metal molten within it, until all the ingot below the sink-head has congealed, there is evidently no necessity of applying heat. The material which has been most commonly used in the making of non-conducting ingot mold tops is fire-brick. Because of the comparative fragility and the conductivity of this material, these sink-head bricks have been made heavy. Bricks made with an admixture of sawdust or similar material which would be destroyed in the burning, leaving voids scattered through the mass to reduce conductivity, would probably be more efficient, but the reduced strength of the resulting brick would probably necessitate making the bricks even heavier than those ordinarily used. Tops of thin metal have been tried, but the heat loss is so great that no appreciable effect is produced. The writer has used a top composed of a metal casing enclosing a thin lining of dried loam. The loam is rammed into position while moist, is easily and quickly dried, the elimination of the moisture leaving the loam in a very porous condition. The conductivity of this dried loam is so slight that the bare hand can be held on the exterior of a 2½-inch casing on an ingot, while a 5-inch fire-clay brick is so hot that it will burn the hand. The comparative effect of brick and loam tops is shown by comparing ingots No. 1 and No. 3 in Fig. 12. the thickness of the frozen metal in contact with the non-conducting material is much greater in No. 1 than in No. 3. In the latter there is only a thin shell of metal which has formed, the remainder of the metal in the sink-head remaining liquid and feeding into the ingot as shrinkage proceeded. In ingot No. 1 the more rapid conduction of heat through the brick has resulted in a fairly heavy wall forming in contact with the fire-brick, and this metal is entirely unavailable for feeding the shrinkage cavity forming in the ingot. In ingot No. 3 the pipe cavity has been entirely contained in the sink-head portion instead of extending down into the ingot, as has been the case with the brick top. The difference in the conservation of the heat was such that a much larger volume of metal in the brick sink-head would be necessary to insure all of the body of the ingot being free from pipe.

With the very efficient heat insulation obtained with dry loam, it has been found unnecessary to apply heat to keep the metal in the sink-head molten.

Some of the various means of keeping ingot tops molten have been in restricted use for many years, but in their use the ingots have been allowed to become cold. For special purposes where the product carried a high price, the heavy cost due to allowing the ingot to become cold, then cutting off the sink-head and re-heating the cold ingot before working it into product could be absorbed, but such practice was out of the question for any except high-priced steel.

(*Continued on page* 374b.)

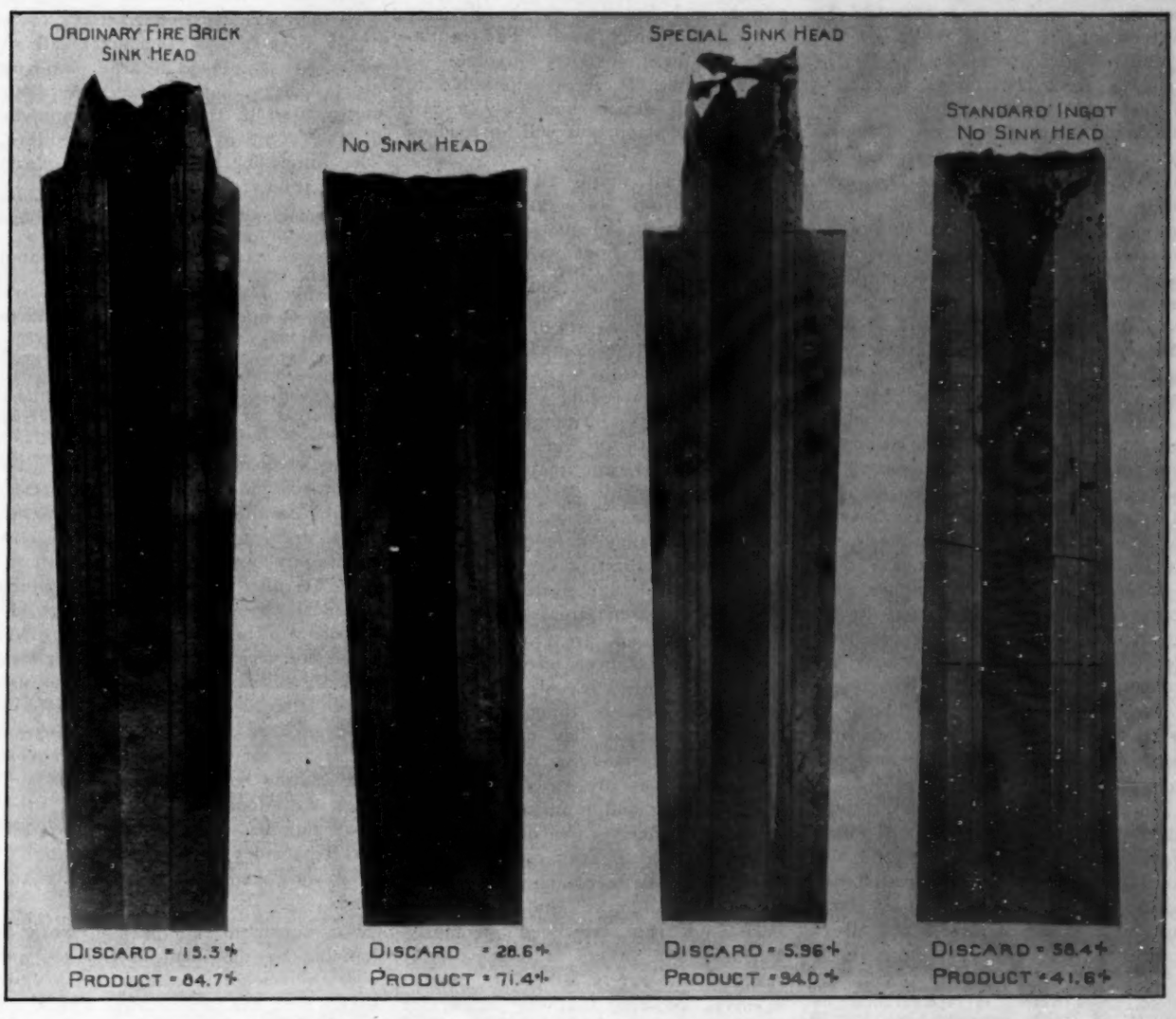


FIG. 12—SPLIT INGOTS FROM HEAT NO. 87,969, SHOWING EFFECT OF VARIOUS SINK HEADS

# Welfare Work of the Tennessee Co.

## What the Tennessee Coal, Iron & Railroad Co. is Doing to Improve the Health and Living Conditions of Its Employes

BY LLOYD NOLAND

THE Tennessee Coal, Iron & Railroad Co. operates ore mines, coal mines, quarries, blast furnaces and steel plants, which are distributed over a wide territory, the greater portion, however, being within a 15-mile radius of Birmingham. About 15,000 men are employed, a little over one-half being negroes. About 34 per cent of the employes live in houses owned by the company. Of the employes living in company houses, about 65 per cent are negroes. A working force of 15,000 men with their families, represents a population of about 45,000, 66 per cent of whom live in the cities, towns, villages and countrysides contiguous to the mines and works, in houses not owned by the company.

Many of the houses owned by the company were constructed a number of years ago without much consideration being given to the type of houses built or to their arrangement and location. In recent years, however, much attention has been given to proper house construction, and much remodeling and rearranging has been done in the older groups, while in the more modern groups the houses have been well planned and located. The modern houses are of three, four and five rooms, with running water, ample yards and gardens, and surrounded by good fencing. Attention also has been given to variations in type of construction and variety in the painting of houses. In addition to houses for employes, commissaries, bathhouses, schools, churches and clubhouses have been built.

Generally speaking, all welfare work comes under the management of the department of health of the company, closely associated with which is the company's educational department. For convenience of handling, the health department is separated into three divisions, sanitary, medical and welfare.

The sanitary division is responsible for the following: Purity of all water supplies; care and disposal of fecal matter; collection and disposal of trash and garbage; cleaning and draining of streets and alleys, including weed and grass cutting; supervision of all house premises; elimination of mosquitoes; inspection of stables; isolation and quarantine of cases of contagious and infectious disease; supervision of milk supplies, and the inspection of commissaries to insure proper protection and purity of all food supplies.

The territory is divided into six sanitary districts, each in charge of an inspector, with a sufficient force under his immediate direction to carry on the work. Inspectors report directly to the superintendent of the department, but keep in close touch with company physicians at all points, the physicians acting as local health officers and directing the handling of contagion of any kind. The sanitation of these districts involves so many items that it is impossible to go into all details and only a few of the more important will be touched upon.

As a usual thing, all houses are furnished from some general water supply with an adequate distribution system to each house. When necessary, this water is filtered or treated at a central plant. Specimens from all general supplies are examined once each week in the company's bacteriological laboratory.

Mosquito breeding is general throughout the Birmingham district from the middle of April to the middle of October, and malaria has not only caused many deaths and much illness, but has seriously interfered with the efficiency of labor. By careful drainage of all pools and swamps when practical, and systematic oiling of the surfaces of streams and of undrained pools, a great reduction in this disease has been effected.

Stable manure is, of course, the great fly incubator, though wet trash and garbage also play an important role. In the handling of this problem, all stables are carefully cleaned each morning and removal of manure is required during the day. Manure incinerators have been constructed at each of the large company stables at a very small cost, and manure is burned if not removed promptly. Farmers and others who use stable manure now rarely fail in its prompt removal, knowing that the incinerator is ready for use at all times. Covered trash and garbage receptacles are provided at each house, and collection and incineration of trash and garbage takes place at least twice weekly. An enormous reduction in flies has been accomplished by the above methods, and with it a marked reduction in the occurrence of fly-borne diseases.

The medical division is organized with the idea of furnishing medical and surgical care for all employes except those residing in Birmingham proper. The work of this division is divided into 20 districts, each of which is in charge of a district physician, who reports direct to the head of the department. These physicians, with their assistants, comprise a force of 35 doctors and 15 nurses, all of whom are employed by the company on a salary basis to devote their entire time to the care of employes of the company and their families. The duties of these physicians and nurses follow:

Physical examination of all applicants for employment;

Physical examination of all school children, together with frequent inspections of the schools;

Close co-operation with the sanitary division in general health work;

The care of all sick and injured employes and their dependents, without regard to the nature of the illness or whether or not injury was received in line of duty.

The company maintains two base hospitals of 18 and 26 beds, respectively, six smaller hospitals of two to eight beds, and 12 dispensaries. A thoroughly equipped central laboratory is also maintained, to which chemical, bacteriological and pathological work is referred by all physicians for assistance in exact diagnosis and treatment. This laboratory also handles work for the sanitary division, such as the weekly examination of all general water supplies, frequent examination of isolated water supplies, examination of milk and other food supplies. During the year 1914 this laboratory reported on a total of 3,696 specimens of all kinds examined.

An enormous amount of work is handled by the medical division, and every physician is constantly in close touch with the community. The scope of the organization enables the employe

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Presented at the recent New York meeting of the American Iron and Steel Institute. The author, Lloyd Noland, is superintendent, department of health, Tennessee Coal, Iron & Railroad Co.

to have a much higher quality of service than he could otherwise secure, for the reason that facilities are provided for proper examination of all kinds, for careful laboratory work and for consultation covering various specialties. In addition, as the service is always on call, ailments are usually discovered in their incipiency, thus saving much loss of time to the employe and many outbreaks of communicable disease. As against this, many useless calls are, of course, made, but gradually this trouble will be eliminated by proper instruction and education. During the year 1914, there were 129,551 applicants for treatment at the dispensaries, and 84,621 calls were made at the homes of employes.

The expense of the medical division is borne partly by the company and partly by the employes through a system of voluntary contribution. Under this system, any employe living within a certain radius of the works and mines may request that he be placed on the "medical list". The payment of 75 cents per month entitles each employe and his dependents to treatment for any possible ailment. At present, practically all employes living in the zone of this service voluntarily avail themselves of its advantages.

While the medical division is doing valuable work, there is one serious drawback to its full efficiency, which is the lack of a large base hospital for the treatment of illness of all kinds, particularly that of a communicable nature. It is impossible to secure ideal results, either from a sanitary or medical standpoint, in the treatment of communicable disease in small and often crowded houses, and the only practical solution is the prompt removal of the patient, as soon as a diagnosis is made, to a hospital maintained for this purpose.

*Welfare Division*

The welfare division has charge of the clubhouses located in various towns; the conduct of courses of cooking, sewing and practical housekeeping for both school children and adults; the kindergarten instruction of children below the school age; home visiting and instruction by social workers and school teachers; the supervision of all playgrounds and schools, and of various social organizations, such as boy scouts, camp fire girls, mothers' clubs, young people's clubs, etc.

The scope of work and the influence of this division is rapidly increasing. At present seven well-equipped class rooms for instruction in cooking and sewing are in operation, with a large and enthusiastic attendance of girls and women. Three kindergartens are in operation with an enrollment of over 100 children, and much useful visiting is being done in the homes of employes, giving opportunity for tactful suggestion and instruction regarding betterment in living conditions.

*Educational Department*

The educational department is charged with the operation of all company schools. These 24 schools are maintained, or partly maintained, by the company in co-operation with the county, and are divided into 12 schools for whites and 12 for negroes, with a total enrollment of 3,311 pupils, under the charge of a superintendent employed by the company.

All the sanitary arrangements at schools, as well as systematic inspection and examination of children and the following up of every absentee, are handled by the district physician in close co-operation with teachers and welfare workers.

The question naturally arises as to what is accomplished by work of this character, and whether the expense entailed is justified. There can be no doubt but that a workman properly housed and whose family is possessed of home comfort is a better and more steady worker than one living in discomfort and dirt. A clean, well-sanitated town, made up of comfortable homes, most certainly tends to stimulate thrift and energy.

Bath houses at mines and works, which are coming into very general use all over the country, are a great advance in many respects. There is no question that the daily bath promotes health and energy, and, in addition, has a great effect on the home, for the house wife must have a clean home and a clean family to meet the clean head of the house on his return from work.

Commissaries are a necessity where negroes are employed. A clean and well-ordered store tends to better business administration always, and, in addition, teaches a valuable lesson to every customer. By strict attention to eleanliness and sanitation in the handling of food stuffs in these stores, protection is afforded to the health of the community.

General sanitation is not only a moral responsibility, but a work that pays, for the prevention of disease is always cheaper than its cure. The sickly workman, or the workman with a sickly family, is an expensive investment always. Pure water supplies mean freedom from typhoid and the dysenteries. Proper care of closets and the prevention of soil pollution mean prevention of the fly-borne diseases and of hookworm. Mosquito prevention work means the reduction or elimination of malaria and increased comfort in living. The proper handling of stable manure and of trash and garbage means the reduction of that dangerous pest, the house fly; and the prompt and efficient handling of contagion means a steady working force, as against a force often torn to pieces by epidemics of various kinds.

The employment of physicians and nurses by the company insures every workman skilled attendance, together with facilities for exact diagnosis and treatment, such as he could not possibly secure in the usual way. Under this system all conditions are treated, no matter what the ailment, or how contracted. This system not only keeps the standard of health high, but it protects the employe from the overburdening expense so often incurred by sickness in his family, and also protects the more ignorant from the designing quack and patent medicine faker. However, the acceptance of the company service is voluntary, and the employes' privilege to secure other medical service is in no way abridged.

The value of the work of the welfare division partly remains to be proven, but sufficient good has already been accomplished to warrant extension of the work and to give much hope for the future. The educational department has already proved its value in a practical way by bringing to the service of the company a class of workman impossible to secure unless facilities for the proper education of his children are available.

The employes of this company consist of 53 per cent negroes, 37 per cent white Americans and 10 per cent Europeans. The negro is easily taught and usually obeys advice and instruction. He is easily approached, and, as a rule, is anxious to improve his conditions of living. As against these good qualities, he is lazy and often will not work unless in actual need of food and clothing. In many instances his family is ignorant of the proper methods of preparing food and of the essentials of home economy. The European, as a rule, is eager for instruction of every kind, and generally sober and industrious. He is apt, however, to live in a slovenly manner and to be entirely ignorant of home hygiene.

*Must Have Good Home Conditions*

It has long been realized that the sober, industrious and hardy workman must have properly prepared food, a clean and well-conducted home and a healthy family; therefore, it follows that wives and prospective wives who are ignorant of housekeeping, sewing, cooking and

of home hygiene, must be instructed if efficient workmen are to be produced. This instruction is being given by the welfare workers to the women, by systematic visiting and teaching in the home, and by the organization of classes meeting at the clubhouses and schools. Every girl attending the company schools is required to take courses in cooking, sewing, etc. Social organizations, such as boy scouts, camp fire girls, young people's clubs, mothers' clubs, etc., are organized and headed by these welfare workers and school teachers, and proper ideals are carefully instilled at every opportunity which is presented. School teachers and welfare workers reside in cottages maintained for this purpose, which serve as an example to the women of the community of how houses should be kept and run.

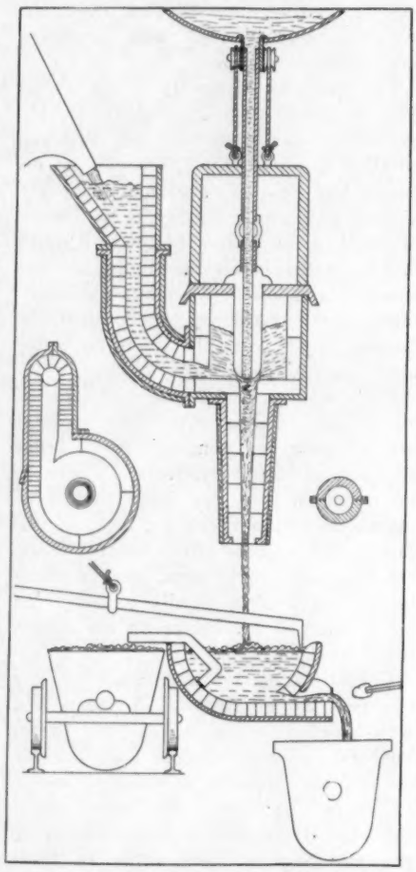
Churches are provided for every community, and much is being accomplished through church and Sunday school work. Kindergarten instruction prepares the small child for entrance to the schools, and relieves the mother of its care during the morning hours. Playgrounds for children, and baseball and football fields for the men, are also provided. The schools are being well attended and their standard is being rapidly improved. Every effort is being made to give practical courses and to secure steady attendance of all children through the eight grades.

The great hope for the future lies in the younger generation now in the schools, on whom every effort is being directed toward physical, mental and moral upbringing. If such efforts are successful, there will be developed in the Birmingham districts a generation of healthy, sober and industrious working men and women, adequately equipped to realize and to perform their duties to the community, to their employers and to themselves.

# Utilizes Flue Dust By Mixing With Iron

A PROCESS for converting flue dust into a form suitable for blast furnace use by mixing it direct with molten iron, has been developed by Ralph Baggaley, Pittsburgh. After completing a series of tests at the foundry of the Seaman-Sleeth Co., Pittsburgh, Mr. Baggaley says his method will reduce the cost of producing pig iron to a considerable extent. The cost treatment by the Baggaley process, it is stated, will not exceed $1.00 a ton, including the cost of remelting. The inventor claims that the necessary equipment can be obtained for not more than $100. Julian Kennedy, engineer, has been associated with Mr. Baggaley in the development and introduction of the process.

The Baggaley method of converting blast furnace flue dust into a commercial product is accomplished by passing molten iron direct from a furnace, ladle or mixer in an even stream through a small swirl basin and thence through a funnel 33 inches long, which extends from the bottom of the basin. A steady stream of dry, screened flue dust is fed into the center of the swirl basin by means of a pipe which has a refractory lip. The lip is submerged in the molten metal to prevent the escape of flue dust into the air. It is claimed that two tons of molten iron and 1,000 pounds of dust can be passed through the basin and funnel per minute. Any number of basins may be used. Mr. Baggaley states that the coke and limestone and a large portion of the silica are burned out of the dust, making it possible to return the remaining metal to the blast furnace, where it can be remelted at a minimum cost. The process is illustrated in the accompanying drawing. The table presented herewith, furnished by Mr. Baggaley, gives results of selected tests conducted by him at the Seaman-Sleeth plant.



BAGGALEY FLUE DUST CONVERTER

By employing a funnel 33 inches long, it is said, 500 pounds of dust can be treated per ton of iron. To recover values from stored accumulations or stock piles it is essential that the material be screened and thoroughly dried before being treated, it being obvious that moist dust would not flow freely through the pipes.

ANALYSIS OF RESULTS OBTAINED BY BAGGALEY METHOD

| | Silicon, per cent. | Sulphur, per cent | Manganese, per cent. | Total carbon, per cent. | Phosphorus, per cent. | Iron, per cent. |
|---|---|---|---|---|---|---|
| **First Test.** | | | | | | |
| Analysis of molten iron before test..... | 1.37 | 0.090 | 0.48 | 3.40 | 0.25 | .. |
| Analysis of molten iron, after test..... | 1.28 | 0.090 | 0.44 | 3.15 | 0.25 | .. |
| Analysis of product..... | 2.54 | 0.092 | 0.54 | 2.83 | 0.25 | 82 |
| **Second Test.** | | | | | | |
| Analysis of molten iron before test..... | 0.86 | 0.085 | 0.36 | 3.58 | 0.22 | .. |
| Analysis of molten iron after test..... | 0.80 | 0.078 | 0.32 | 3.51 | 0.20 | .. |
| Analysis of product..... | 2.25 | 0.100 | 0.60 | 3.10 | 0.28 | 84 |

## Phosphorus in Steel Castings

When there are parts in carbon-steel castings richer in phosphorus than others and the steel is reheated to refine the structure, the parts richest in phosphorus will usually have the smallest crystals, according to a paper by J. E. Stead, read before the British Iron and Steel Institute.

The lower the phosphorus the larger will be the crystals in steel castings, the reason being that the primary crystallites, during development in the more phosphorized steel, and purer than the remaining liquid which precedes them in the mold. This concentration lowers the freezing point and admits the growth of new crystallites continuing beyond the impure liquid.

# How Tin Plate is Made in Germany

## A Discussion of the Economic Phases of the Question With Details of German Methods of Manufacture

BY VON W. KRAMER

IN England some consumers of tin plate buy black plate from the rolling mills and tin it themselves. This is not the case in Germany, due partially to the fact that the German works rolling black plate invariably tin it before it is sold in order to obtain a better price. Also the users of tin plate in Germany are not acquainted with the equipment and character of experience necessary for the production of good tin plate from black sheets. Nevertheless, there are a large number of tin plate users in Germany who would find it profitable to establish tinning departments. Black plates are more easily obtained in Germany than tin plates, there being many small rolling mills that are not equipped for tinning, which, however, could be depended upon to furnish plenty of black plate.

That Germany is short of tin plate establishments is indicated by the yearly importation of 40,000 to 50,000 tons of English tin plate, under normal trade conditions. At the present time there are only seven tin plate works in Germany, all in the western part of the Empire. In central and eastern Germany there are at present no factories of the kind. Owing to the inability to import tin plate into Germany under present conditions the works at Rasselstein and Nachrodt have enlarged their capacity; also the Dilligen and de Wendel works, together with the firm of Capito & Klein in Benrath, which recently commenced the manufacture of tin plate, are extending their business. After taking all of these enlargements into consideration, however, the production of tin plate in Germany is running about 10,000 tons short per year. Accordingly it is believed that Germany will be an importer of tin plate for many years to come, especially when the increase in consumption is taken into consideration. Up to date, German manufacturers have not been able to make the lower grades of tin plate as cheaply as the English.

The prices for tin plate quoted in England were used successfully by German consumers to depress the price of the German product resulting in a tendency toward progressively lower quotations. This has had a bad influence on the quality of the plate. It appears plain that the consumers themselves are, to a certain extent, responsible for the unsatisfactory quality of the material, owing to their constant efforts to hammer the price. The tin plate works have to make a reasonable profit, and under existing conditions this can only be done by decreasing the cost price at the expense of quality.

Also the turning, folding and drawing operations, to which tin plate is subjected at the present time, tax the physical qualities of the metal severely. The purposes for which tin plate is used today demand a high quality of raw material.

It is a well known fact that for manufacturing high grade tin plate only excellent black plate can be used. Also the different kinds of tin plate demand different qualities in the steel and a metal which is satisfactory for the heavier gages cannot be used for the thinner plates. The successful economical production of tin plate in Germany depends upon obtaining a satisfactory quality of black plate from the rolling mills, forming a foundation for a favorable cost price

Reprinted from a recent issue of *Stahl und Eisen*.

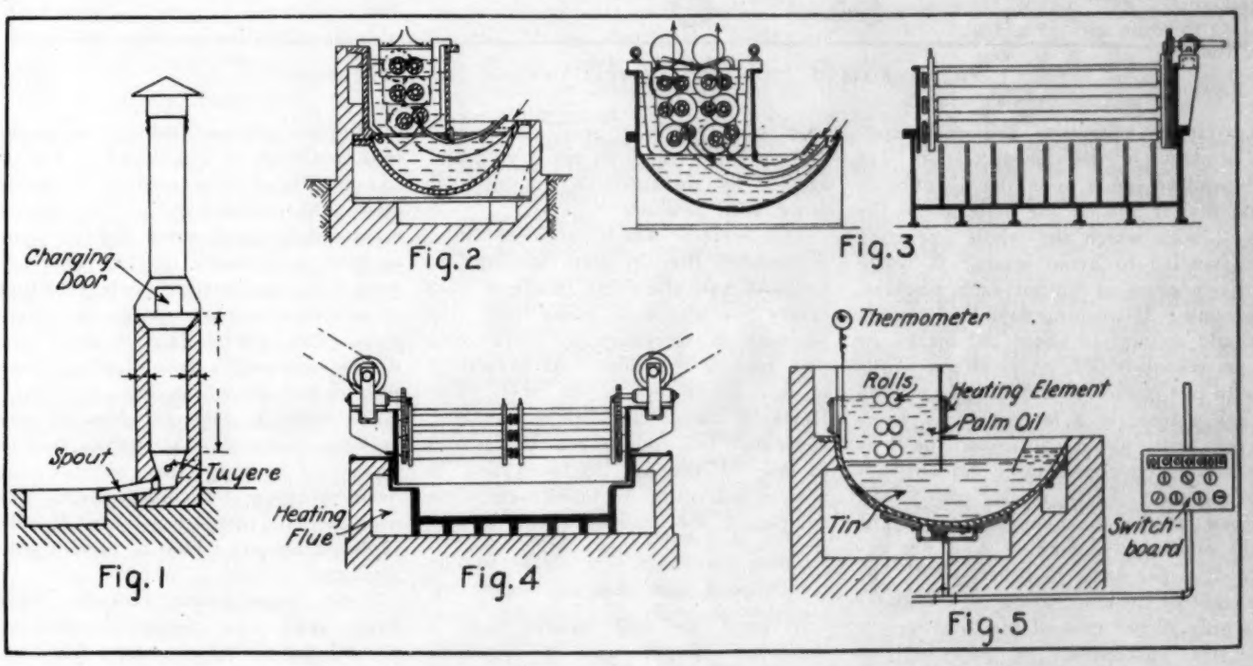



FIG. 1—CUPOLA FURNACE FOR RECLAIMING TIN FROM DROSS

FIG. 2—HORIZONTAL TINNING MACHINE

FIG. 3—DOUBLE TINNING MACHINE

FIG. 4—TWIN MACHINE WITH DIVIDED ROLLS

FIG. 5—ELECTRICALLY HEATED TINNING MACHINE

in the tinning department. Even the most modern and efficiently managed tinning establishment cannot stand a high black plate price. One reason why English tin plate is cheaper than the German variety, is found in the lower price of English coal. Also the grease for the rolls, acid, etc., used in the tinning industry are cheaper in England.

England, however, can hardly make black plate any cheaper than properly equipped German steel works because large quantities of it are imported by Great Britain every year. The main reason for the lower price of the finished product is found in the superior skill of English workmen. The two questions of a suitable supply of skilled labor and an adequate tonnage of first class black plate are of paramount interest to the German iron and steel industry. Once they are solved, German tin plate works will have no difficulty in attaining a satisfactory output at a suitable cost. The cost of the product does not depend so much upon the quantity of tin that is laid on the plate as on the skill with which the whole operation is handled to avoid waste. A waste of one gram of tin for each machine, assuming 25 working days in a month, would amount to about 280 marks, or approximately $67. A small tin works with but one or two mills could stand such a loss; in a larger works, however, with about 20 mills, the loss would reach considerable amount, approximately 5,600 marks, or $1,345. Even in the most up-to-date plants, the efficiency of tinning does not exceed 90 per cent; in other words, the weight of the tin coating on the plates is only 90 per cent of the total weight of tin purchased. A part of this loss is due to the formation of tin oxide. This oxide contains from 50 to 60 per cent tin, about 10 per cent of volatile elements, and 40 per cent tin ashes, including 5 to 7 per cent iron. Cutting down the loss of tin forms one of the principal endeavors of progressive tin plate manufacturers. In Germany most of the tin in the oxide is recovered by remelting; it is not, however, used again in plating furnaces, but is sold to brass foundries. The by-products obtained from this refining process also are utilized in the enamel industry and in other ways.

### *Furnace for Refining Oxide*

The oxide may be refined in a small pit furnace similar to that shown in Fig. 1. When it is melted it is mixed with charcoal and borax. The furnace, it will be noted, operates on the cupola principle and an air pressure of about 16 inches of water is employed. The tin and slag are run out through the spout into molds; the slag rises to the top and the clean tin may be easily separated from it. The hard gray slag which still contains traces of tin is sold and utilized by tin smelters who melt it down with new ore.

The secrecy which, until recently, surrounded the tin plate industry in England and elsewhere, made it necessary for concerns going into this business in Germany to build their own tinning machines. At present it is not necessary to do this. The Deutsche Machinenfabrik, Duisburg, Germany, has undertaken the manufacture of tinning machines and is now in a position to furnish complete equipment for plants of the largest size.

### *Speed and Skill Essential*

A good tin mill should have a maximum output with a minimum consumption of tin; also it should turn out a product with as few defects as possible. The tonnage depends upon the speed of the tinning rolls and the skill of the workmen. The consumption of tin also varies directly with the speed of the rolls. Therefore, it is not possible to run the mill beyond a certain speed, if the consumption is to be kept within proper limits. In order, therefore, to increase the output without increasing the speed of the rolls, machines have been built with long rolls which can handle two or three plates side by side at one time. However, if the rolls are too long they sag in the middle and the plates at this point receive too heavy a covering of tin.

The quality of the black plate is the determining factor in attaining a normal tin covering. Rough plate requires a large excess of tin, amounting to as much as two or three grams per plate. When such plates are used a favorable cost price is impossible. Unfortunately rough plates cannot be improved very much by cold rolling.

Figs. 2, 3 and 4 show various types of German tinning mills. A single mill is shown in Fig 2 and a duplex one in Fig. 3. As mentioned previously, the production of the mills is increased by lengthening the rolls, but as was suggested, if they are too long they sag in the middle resulting in unsatisfactory operations. To overcome this, the rolls frequently are divided, making a twin machine similar to that shown in Fig. 4.

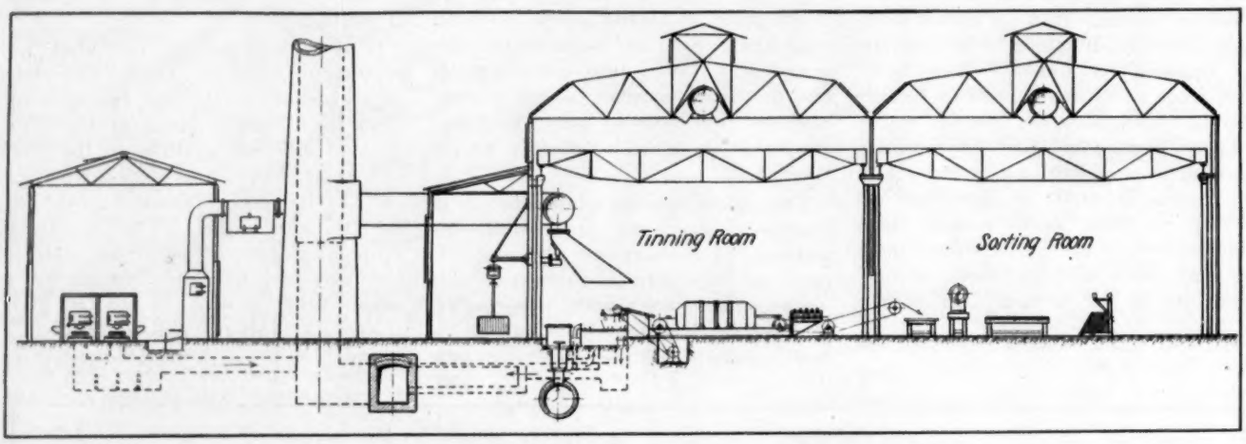



FIG. 6—CROSS SECTION OF A TYPICAL GERMAN TIN PLATE WORKS

Inasmuch as lack of gloss on the surface of the plate is usually due to incorrect heating, this subject has been given careful consideration. The use of solid fuel has been largely replaced by gas which is more easily regulated.

Some experiments recently have been made in Germany looking toward the use of electricity for heating tinning machines. Fig 5 shows an electrically heated machine; the arrangement of the heating elements may be plainly seen on the drawing.

# By-Product Ovens for Foundry Coke

## Pointers on the Operation of a Coke Oven Battery—Working Conditions Must Be Uniform to Produce Satisfactory Results

BY C. S. LOMAX

PROPERLY prepared by-product coke is rapidly assuming a place alongside first-class bee-hive foundry coke. The two kinds of coke are simply the result of two methods of melting coal and distilling out the volatile matter. The bee-hive oven burns out the combustible, volatile matter and some carbon, while the by-product or retort oven distills the coal in a gas-tight retort from which air is totally excluded. The by-product coke oven was introduced into this country in 1893 with claims that a wide range of coals could be coked by this process. Naturally the process was introduced with the same form of oven, accessories and methods of coal and coke handling as existed at that time in the countries from which the oven came, that is, Germany and Belgium.

In 1908, with 4,007 by-product ovens in existence in the United States, only seven plants, totaling 710 ovens, made efforts to sell foundry coke and their foundry sales were but a small fraction of their total product. The large majority of the original by-product oven plants were built by steel companies to make their own blast furnace coke. Today a number of different interests are selling by-product coke to the foundry trade.

### *Early Conditions*

As the progress of retort coke has been slow, it may be well to state some of the causes for this slow development, especially in the foundry coke trade. The earlier plants built for other than blast furnace coke supply faced the following conditions: Comparatively little was known of the coking action of American coals in by-product ovens. Contracts with blast furnaces were necessary to keep the ovens running uniformly, hence blast furnace coke with domestic coke as a side issue was a simpler proposition than making foundry coke. If a suitable coal or coal mixture was not used, the coking action of the ovens was far from perfect. The operator either had no sorting apparatus and forked the foundry coke on a bench, which cost too much, or his classifying apparatus did not satisfy the foundryman's needs. It must be added that the by-product manager sometimes let his desire for by-products dominate his judgment in the selection of a coal or coals.

With 43 plants now in operation in 14 states, it is evident that not only the large steel companies but the principal by-product coke oven contractors and the jobbing by-product plant operators must have made a careful study of the coking qualities of the coals which are commercially possible for use at the sites of the various plants. This has been done by making the ordinary proximate coal analysis, including the chemical analyses for sulphur, phosphorus and nitrogen, and a laboratory determination of the by-product and gas yields of the various coals by carbonization on a small scale in tubes. This is known as a tube test for gas, tar, ammonia, benzol and coke. By comparison of these laboratory results with coking tests in ovens which were part of a regular operating battery, the promising coals have been classified by most of the operators and construction firms. The latter have generally reserved the right to make coking tests on a working scale in the plants they have built and one of the oldest firms has retained the operation and management of a large majority of the ovens built by it. The data thus collected have enabled the operators to make an acceptable coke.

Starting with the proper coal or coal mixture the by-product oven should be operated at as uniform a rate of production as possible, both for the sake of the life of the oven and to get the best coke structure. This formerly meant that the production of foundry coke was a side issue of very small proportions in a plant under contract to furnish blast furnace coke. Today the foundry coke market has demanded retort coke to such an extent that several plants make it their chief product, and where blast furnace and foundry coke are produced, the care bestowed upon the making of foundry coke and the apparatus provided are as complete as if it were the only product, for it has become an aid in procuring the uniformity of operation necessary for its own production. Uniformity of operation, by which is meant here the completion of the coking of each oven in the same time, is the surest method of getting rid of the faults of under-coking and over-coking. The former fault produces black ends. The latter multiplies the cross fractures so that the size of the average lump is too small. The coke may be free of breeze and dust and the remainder of the preparation well done, but each handling shatters the over-coked product until it is very poor cupola fuel.

Having procured a coal and a possible coke market, the by-product coke producer formerly worked with an oven inferior in several ways to those now available. In the matter of obtaining uniformity of oven wall temperature and hence coke similar in structure along the entire length and height of the charge, the facilities now afforded are better because the builders have a clearer understanding of the control of drafts, combustion, sizes of flues, methods of introducing and distributing fuel gas in the oven wall and have made easy the inspection of all parts of the oven flues, at the same time putting in accessible means for controlling the heats in the various parts of these flues.

### *Aids to Improvement in Quality*

The widespread, and in fact almost universal, use of American silica brick during the last decade has improved the oven and hence the coke by making the walls more refractory and of higher heat conductivity. These properties have helped reduce the coking time in that higher heats could be carried in and transmitted quicker through the oven wall to the coal charge. A further aid to heat control and hence good coke has been the continually increasing use of recording gages, thermometers, pyrometers and calorimeters. They help the by-product oven heater and operator reduce to facts for his use, many things, which a few years ago were lightly supported theories. From exact comparisons he knows how much gas pressure and stack draft will produce the right heats for a desired coking result. Formerly he assumed these things from a hazy experience. In a similar way he

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The author of this paper, which was read at a recent meeting of the Pittsburgh Foundrymen's Association, is general superintendent, Lehigh Coke Co., South Bethlehem, Pa.

keeps in touch with the thermal value of the gas he is making and the drafts and pressures which affect this value.

Many of these matters are vital in a by-product coke plant, if high grade coke is to be a regular product. Another of the by-product coke oven operators' burdens has been removed by the improvement in the coke oven door. For some years this door was simply a cast iron frame filled flush to the front with firebrick and fitted to the outside of the brickwork of the oven. Necessarily, there was a layer of coal which did not receive as much heat as that further toward the interior of the oven, as this coal lay against the unheated door and was outside the first heating flue. In the doors now used in one type of ovens, the brick projects 4 inches into the oven. This pushes the charge of coal back far enough so that the coal next to the door has an equal chance to be heated with that in other parts of the oven. The result is an elimination of the "black heads" or partly coked coal which formerly ended an oven of coke.

*Regulation of Moisture*

One of the former prevalent beliefs was that by-product coke was a rather blackish looking sponge soaked with water. This idea was no doubt started by the lack of the proper coal and coking facilities, as previously mentioned, but it was fostered by the fact that the arrangements for quenching and handling the coke after it had been pushed out of the by-product ovens were inadequate for the task of producing a good looking coke and coke low enough in moisture to compete with the bee-hive product. The first few plants selling foundry coke on any scale pushed their coke from the oven on an inclined wharf where it landed in an irregular heap. This heap was roughly pulled apart before, during and after quenching with a supply of water from hoses. This method quenched the coke rather slowly, permitted the surfaces of the lumps to burn to a dull leaden or black color and wet one part of the coke a great deal more than another.

Coke for foundry purposes was then forked out and carried either by a belt conveyor or barrow to the car for shipment. In consequence of the restricted space in front of the battery of by-product coke ovens, the loading had to be done rapidly and the amount of water put upon the coke was left to the judgment of the man with the hose. The result was a dull looking product with an unknown moisture content, regardless of the structure, or size of the coke. As coke sampling for moisture in a carload is a difficult task to accomplish accurately, there arose differences between the buyer and seller as to the allowances for moisture. The next step forward was the adoption of the inclined deck quenching car built of iron and steel which received the oven load of coke as it came out and spread it in a tolerably even layer on the deck of the car. Water was applied to this quencher load of coke either in front of the oven or at some point beyond the end of the oven batteries, but the quenching was done entirely in the car and in such a manner that the amount of water applied to the coke was still a matter of judgment on the part of the quenching car operator. This was an improvement, but it did not result in as consistently low a percentage of moisture as was necessary, even though enough cars were provided to let the coke steam off in the car itself.

This system has been improved by the use of a quenching station at which water is dropped in the form of a heavy rain upon the coke from a series of pipes covering the length and width of the quenching car, the water supply being kept at a fixed pressure and the valves kept open for a definite time in seconds. At the end of this period the car is moved alongside of an inclined coke wharf. The doors at the discharge side of the car are opened and the coke slides out upon the wharf. In this transfer any hot spots in the coke are uncovered and a small amount of water applied to them. By making the coke wharf of sufficient capacity, an oven charge of coke is allowed to stay upon the wharf for 15 to 20 minutes to dry and cool. Valves or gates at the lower edge of the wharf are then opened and the coke permitted to feed on a belt conveyor which takes it up to the various forms of screens which first separate the dust and breeze, then remove all coke smaller than 3½ x 3½ inches and finally deliver the over-size pieces upon a belt or chute for delivery into the shipping car. At either the head of the first conveyor or during its progress in the last belt, the operator picks out any coke of objectionable structure. If the screening and the coking has been well done, there is very little hand picking.

The coke is distributed in an even layer over the entire width and length of the car and not more than 2 feet in depth. The weight of the coke and the amount of heat is always practically the same, and at the quenching station a measured amount of water is applied in a definite and regulated time. If this quantity of water and the speed at which it has been applied has been right, much of the coke brought back from the station to the cooling or receiving wharf is in the condition of having its outside quenched and somewhat moist but its inside is almost red hot. In sliding from the quenching car to the wharf the coke mixes to some extent and it is seldom that more water has to be put upon any part of it. After a short experience with this method of applying the water, coke is placed in the car for shipment with the moisture percentage at the command of the operator. It is an entire departure from the method of judgment on the part of the workman. It is to be noted, however, that the uniformity in size of lump and structure above mentioned is essential to success in moisture control.

*Color of Coke*

It will be found also that if the coke is removed quickly in the quenching car from the oven to the quenching station and the required amount of water quickly applied, the color of the coke will be good because it has not been given time to burn its surface rough. If the coke structure is good, the dull color is only a surface effect.

In the various handlings from the oven to the quenching car, from the quenching car to the wharf, from the wharf to the conveyor, over the screens and from the screens into the cars, the coke must either slide or be carried on conveyors and not dropped further than the smallest possible distance before it lands finally in the car. This is necessary as no amount of previous preparation will keep any coke from breaking up under a succession of drops.

To secure for the consumer an elimination of all coke smaller than a 3½ x 3½-inch size, one of the two methods favored is the use of short rotary screens running at a speed of 12 to 15 revolutions per minute with perforations to suit the size of the undersize wished. A later device and one which is finding much favor is the rotary grizzly, a screen which consists of a number of rows of parallel rotating cast iron discs 18 to 24 inches in diameter. The distance between discs on the same shaft is 3½ inches and the rows are at such a distance from one another that the space left for the under size coke to pass through is about 3½ x 3½ inches. As the tops of each row of discs move toward the discharge chute of the apparatus, the over size coke passes along the tops and finally lands

(*Continued on page* 374b.)

# Good Results Follow Careful Work

## South Range on the Cuyuna Promises to be a Lively District—High Grade Ores in Widely Separated Places

IN AN article appearing in *The Iron Trade Review* of July 22, on the Cuyuna district, the developments on the north range were described, as of July 1. In this article the developments on the south range will be described, as of Aug. 1.

The Cuyuna district, as is probably now known by most men interested in Lake Superior iron, involves a large territory which embraces numerous magnetically-defined areas. Some of these areas are designated by local names, but the two principal ones are called north range and south range. There is nothing to indicate a range, as that term is used to mean a topographic feature. In the early days of the district, nearly all the prospectors would invariably enter the district from the village of Deerwood, on the Northern Pacific railway, some going northward two or three miles while others went southward, in each case to prospect in a magnetic area, hence the designation "north" and "south", but the term "range" was apparently merely tacked on for the sake of euphony. It developed that each range for a considerable distance paralleled in its strike the direction of the Northern Pacific railway right of way from Duluth to Brainerd to St. Paul, and this railway is now by common usage considered as marking the line of separation between the two ranges, although this railway crosses the south range at both its eastern and western extremities.

### *Striking Differences*

Drilling explorations and mining developments have brought to light a few striking differences between the north and south range ores and ore deposits; therefore, up to the present time, the two terms north and south have a broader significance, at least locally, than merely the meaning implied by their relative geographical positions. Thus, north range deposits are prevailingly wider, deeper, of a greater tonnage per 40-acre tract, most of them contain some highly manganiferous material and very much cherty material, and their surface covering in many instances is shallow; the ores being prevailingly reddish in color; while the south range ores are invariably brown. Structurally considered, for both ranges the general attitude of the deposits is similar, but north range deposits as a whole are more folded and, therefore, are wider and more irregular in shape.

For a long time, north range ores were found to be of higher average iron content, but the impression greatly exceeded the fact, for actual calculations on a tonnage basis showed that as a whole, considering all 50 per cent material as ore, the north range ores never averaged more than 1 per cent over the south range ores. True it is that certain individual north range deposits were very much above this average; these, therefore first received attention and were opened early. But recent developments on both ranges make it plain that even some north range deposits have their serious drawbacks which thus far are not indicated in the explored south range deposits, and when once the explorations per unit area on the much larger south range equal the explorations per unit area on the north range, the former will receive more consideration than it has to date and may even eclipse the latter in importance.

The first shaft ever sunk on the south range was the first one sunk in the district. It was a small exploration shaft in section 8, 45-29, by Pickands, Mather & Co. The shaft was 126 feet deep; a 200-foot cross-cut and an 80-foot drift were driven, after which the work was discontinued and none has been done there since. The property is only partly drilled and offers good opportunities for a large tonnage.

The next operation was six years later and was by the Virginia Ore Mining Co., in section 10, 44-31, but was abandoned. A simple but substantial operation was conducted and about 60,000 tons of ore were shipped. This property was and still is known as the Barrows mine. The ore shipped had a fairly high iron content and was reported by the consumer to be a satisfactory ore. The tonnage in this deposit can be increased by further drilling.

### *Cuyler Adams' Operations*

About two years ago, Cuyler Adams, of Deerwood, who has large interests in the district, opened the Adams mine in Section 30, 46-28, south of Deerwood. A circular concrete shaft was sunk, and a 200-foot cross-cut and a 600-foot drift were driven. Last fall, all work was discontinued and the mine is still idle. The drift encountered a remarkable run of ore, averaging nearly 60 per cent in iron which had not previously been shown by drilling. The present known tonnage in this deposit is far less than the probable tonnage.

The operation next following was by a stock organization, in Section 36, 45-31, in the city of Brainerd, known as the Brainerd-Cuyuna Mining Co. A wooden drop shaft was sunk, a 100-foot cross-cut to the deposit has just been completed and drifting in the ore body is now in progress. This deposit is only partly drilled, but bids fair for a substantial tonnage. The ore is typical south range brown ore.

A year ago the Canadian-Cuyuna Iron Mining Co. dropped a shaft on Section 13, 45-30, at Woodrow, near the Pickands, Mather & Co. operation just described. This work progressed with astonishing rapidity. The company has already shipped about 10,000 tons. This deposit, known as the Wilcox, is well explored, is narrow but long and deep, and, according to the estimate by the Minnesota tax commission, contains about 4,000,000 tons of ore averaging 55.5 per cent in iron. The ores are being shipped to Canadian furnaces, with which the operating company is in some manner allied.

### *The Barrows Company's Shaft.*

The most recent undertaking is that by the Barrows Mining Co. in Section 16, 44-31, near the Barrows townsite and the Barrows mine. The company is just beginning to sink a rectangular, reinforced concrete shaft.

During the last 12 months, drilling operations, by developing some remarkably good ores in widely separated places on the south range, have upset many of the former adverse speculations regarding south range deposits. On Section 7, 45-29, adjoining on the west the Pickands, Mather & Co. operation in Section 8, and adjoining on the east the Wilcox mine in Section 13, the E. J. Longyear Co. developed a substantial tonnage of excellent red ore on one forty, the only red ore known on the south range. On Section 15, 44-31, adjoining the Barrows Mining Co. operation in Section 16 and just south of the

Barrows mine, the feeowners have just systematically developed one of the largest and most compact deposits of attractive ore per south range forty. Much of the ore analyzes over 60 per cent in iron, and in one angle drill hole 50 feet of ore averaged less than 2 per cent in silicon. In section 21, 45-30, two miles east of Brainerd, the E. J. Longyear Co. is now bringing to a close partial explorations which show astonishing results. The tract is virtually 40 acres and contains a larger tonnage of 60 per cent ore, some of which analyzes 65 and 66 per cent in iron, than any other. A few miles further east, in Section 14, 45-30, Culver C. Adams and associates have developed a large tonnage averaging about 57 per cent in iron which is low in silica. It is the intention of these parties to have a shaft sunk in the near future.

The earlier drilling, because of the large territory that had to be covered, was never thorough or complete as to any one property, and as a result large tonnages were then never developed. But the recent concentrated and methodical drillings have produced excellent results and one has reason to feel that the south range may ere long become a lively district for operators and in time be a husky rival of the north range in the quantity of ore mined. The prospects for stripping operations on the south range are not very favorable, not because of the depth of the surface, but because of the prevailing narrowness of the ore deposits.

## Builds Tin Smelter

The American Smelting & Refining Co. has recently commenced work on the erection of a new tin smelter at Perth Amboy, N. J. This plant, which the company says is to be of an experimental character, will have capacity for producing 1,000 tons of tin per month and is expected to begin operating no later than Jan. 1, 1916. Its raw material will be ore from Bolivia, of which the company has contracted for an adequate supply of concentrates having a tin content ranging from 55 to 70 per cent. This announcement gains in importance from the expectation that the new plant will produce from this ore, which abounds in impurities, a grade of tin fully equal in quality to Straits tin, which is used universally in this country for making tin plate. The process to be employed is an entirely new one and differs radically from that used in England the last 300 to 400 years for smelting Bolivian and other impure ores; the metal produced by this old process from these ores never having been found satisfactory for tin plate making. The American Smelting & Refining Co. has been employing its new process for some time past in a miniature smelter which has an output of 100 pounds of tin per day. The product of this smelter averages 99.94 per cent pure tin and this has been tried out by a prominent tin plate maker with uniform success. The marketing of this high grade tin made from Bolivian ores, it is expected, will result in a decreased use of Straits tin in this country.

## Silica-Graphite Paint

A practice that is becoming popular in progressive power plants is the use of paint for the inner surface of steam boiler drums. The paint is said to afford protection against pitting. Silica-graphite paint is used for this purpose and for a number of years the manufacturers of this paint have coated the steam drums of five Babcock & Wilcox boilers developing 1,800 horsepower and as a result the drums are said to be in almost perfect condition.

According to another instance, in a plant equipped with boilers developing 8,400 horsepower, the interiors of the drums were scalded, painted both above and below the water line and allowed 48 hours to thoroughly dry. This treatment was repeated every 10 months and not only did it stop pitting but where it had previously taken six men seven days to clean the drums of one boiler, two men now are enabled to clean them in a day.

# GREAT INFLUENCE OF STRONG MEN

### Fourth of a Series of Short Talks on Iron Mining

BY P. B. McDONALD

*In some of the Lake Superior iron mining towns, the influence shown by the personal ascendency of the general superintendent for the principal mining company, has been akin to that of a French priest in a Quebec village. And in several instances this general deference to the wishes of one strong man has immeasurably helped the community, because it binds together the various nationalities or factions which would otherwise have made for discontent and disagreement.. There have been, it is true, cases where a mining superintendent chose to substitute autocratic officiousness for the broader and better paying policy of understanding his men and their needs, but on the whole the iron ranges have been peculiarly free from any serious labor troubles such as afflicted the Michigan copper country just at the north of the iron district. Generally speaking, the Lake Superior miners, while appreciating a certain amount of "paternalism" and "welfare work," prefer a manager who personally shows them that he knows something about mining and about themselves, rather than a manager who fortifies himself behind a mass of officialdom and forms. This may sound unnecessary, but such a matter actually means "dollars and cents" to an operating company: for while things may never come to the pass of a disastrous labor strike, there is probably nothing so costly to a large mining company as discontent underground. Furthermore, it is a significant fact that in some of the Lake Superior towns where three or four mining companies are operating side by side, having had about the same conditions to start with, one company seems to attract and keep most of the intelligent, steady miners, who break more ore with less dynamite (and less work) than the motley, changing miners at the next mine.*

*The Cornish atmosphere prevails at most of the Lake Superior mines, due to Cornish (or "Cousin Jack") miners and bosses who retain their native independence of spirit and who incidentally are natural-born miners, coming from generations of mining families that climbed around the deep, old tin mines in Cornwall before the Lake Superior district was ever heard of. Among the famous "Cousin Jack" miners who gave their vigorous, ingenious aid to developing the iron and copper mines, are those who have risen to positions of considerable responsibility and influence in mining affairs, including mine owners, corporation presidents, general superintendents, and many lesser officials. In the way of understanding the hearty Cornish temperament, there are several humorous characters among the miners who illustrate their provincial peculiarities, such as fondness for "parties" and general good feeding; the inimitable Cornish dialect with h's dropped and put on in bewildering fashion; their like of a little authority; and their homely common sense.*

# Urge Use of the American Fuse

## Russian Sub-Contracts Temporarily Held Up, But Large Volume of Business Will Doubtless Be Placed in Central West

SUB-CONTRACTS of the Russian government's order for 10,000,000 to 13,000,000 high explosive and shrapnel shells, for which contracts have been tentatively placed with American concerns pending final arrangements, are being held up due to certain changes in specifications which must be passed upon by the new Russian commission, declares the president of a Cleveland corporation, which is turning out certain parts of war munitions.

One of the questions still remaining unsettled is the type of fuse for the shrapnel shells on these contracts. Strong pressure is now being brought upon the commission by the manufacturers of the United States to cause them to adopt the standard American fuse as it is now being used by this government, or so modified in weight and other essentials to fit the standard Russian shell. The United States manufacturers realize that the only ordnance men in this country available for this work are thoroughly familiar with the American type fuse, and while they could no doubt successfully handle any of the foreign fuses, their familiarity with the standard practice in this country would greatly facilitate deliveries on this portion of the shells.

Should the commissioners insist upon the standard Russian fuse specifications, a considerable period of time must elapse before manufacturers could produce these, due to the period of experimentation necessary. It would further be a tremendous advantage to the United States government to have manufacturers in this country who have not only the experience, but also the equipment for producing the American fuse.

The American type of fuse is now being accepted by the English government adopted to its standard shells, and it is an accepted fact among well-posted ordnance men, that the American fuse is equal to, if not superior to any foreign fuse now manufactured. Its few working parts and simplicity of construction make an immediate appeal to those who are familiar with this class of munition.

The weight of the fuse is an important factor in the complete shrapnel shell, and while the American fuse now being used by the British government is considerably heavier than the standard British fuse, the objection has been eliminated by removing 18 shrapnel balls from each shell.

The use of aluminum in the American type of fuse, adopted to the Russian shell, enables the use of this fuse on the standard Russian shell without modification of the shell in any way. The stem of a standard Russian fuse is much smaller in diameter than the standard American fuse, which necessitates the re-arranging of the firing mechanism in the base of the fuse. However, a number of excellent designs have been produced by American designers, which function perfectly in the more contracted space.

The standard Russian fuse timing is figured in feet, from the muzzle of the gun, instead of seconds as is the standard American practice. This difference, however, can be readily computed.

It has been claimed by students of artillery practice that the standard type of Russian fuse is of German design. It has been further intimated that, in the designing of this fuse, it was deliberately made a difficult manufacturing proposition, but when properly made, it gives entire satisfaction, and its efficiency equals that of the average time fuse now in use.

The American Multigraph Co., which recently revised its charter to enable it to do a general machine shop business, has taken on orders for primer bodies for the English shells; this work, together with certain automobile part contracts, is gradually filling up the capacity of the plant of the company, located in Cleveland.

Reports of large ammunition contracts, which have been going the rounds of recent date, are absolutely denied by H. C. Osborn, president of the company. He further states that he has been misquoted in regard to a large portion of the recently placed Russian contracts coming to Cleveland. He did state, however, that eastern plants equipped for this class of work were very rapidly being filled up to their capacity, and if these orders continue to come to this country much work must naturally come to the central west. Cleveland, being so well equipped in machine shops for diversified manufacture, is almost certain to get its share of this production.

The inability of machine tool manufacturers to make prompt deliveries on the class of machines used in this work has prevented many concerns from extending their present equipment, and many others, which have all the other requirements but machinery, from entering the field. Therefore, those plants that are properly equipped for quantity production are surely in a preferred position.

## Bethlehem Buys Plant

Official confirmation is made that the Bethlehem Steel Co. has purchased the plant of the Detrick & Harvey Machine Co., Baltimore, manufacturer of heavy machine tools. This company has been doing finishing work on war orders for the Bethlehem Steel Co., which has consisted principally of the making of gun parts. It now is planned by the Bethlehem company to extend the capacity of the machine plant and to carry on this finishing work on a larger scale. The Detrick & Harvey Machine Co. has had a long and honorable career, having been established in 1884 by Alexander Harvey and John S. Detrick. It is officially denied that the Bethlehem Steel Co. has purchased any of the plants of the M. Rumley Co., Laporte, Ind., or has taken over the Allis-Chalmers Mfg. Co., rumors regarding which were current in New York the past week. Both these companies have been working on war sub-contracts for the Bethlehem company.

**Installing Equipment.**—The Youngstown Sheet & Tube Co., Youngstown, O., is equipping its East Youngstown plant with 11 additional boilers with Sanford-Riley 6-retort underfeed stokers. In its rod and wire department, the company recently has installed four additional staple lock fence machines of its own design. At the plant of the Western Conduit Co. a subsidiary of the Youngstown company, 12 additional vertical conduit machines which will increase the capacity of the department 300 per cent, have been installed.

**War Order.**—The Garland Corporation, Pittsburgh, manufacturer of rivets, bolts, etc., has received a contract for $68,000,000 of war munitions, to be delivered in the next 18 months. Details of the order have not been announced.

# Bolling Commands Troop

## And Many Prominent Manufacturers Are Active in New York's Military Training Camp

A number of iron and steel men are taking part in the military training camp for business and professional men which the government is conducting at Plattsburg, N. Y., during the month of August. The purpose of this camp is to give a large number of citizens preparation in the rudiments of military service which will create a reserve force of volunteer officers for the national army. The more than 1,000 men participating include many prominent names in professional, business and social circles. All of these men are volunteering for the month's camp and bear a considerable part of the expense themselves. Mayor Mitchel, of New York, Theodore Roosevelt Jr., and other well-known men are enrolled. Major General Leonard Wood, who arranged the camp, will be the chief officer in charge.

One of the interesting detachments which will take part in the maneuvers is an experimental motor-transported machine gun troop which was organized and officered by Raynal C. Bolling, general solicitor of the United States Steel Corporation. There are about 70 men in this troop, which is equipped with 12 or 15 automobiles and motor trucks, 20 machine guns and two one-pounders. Prominent lawyers, bankers and businessmen from New York, Philadelphia, Pittsburgh, Boston and other cities, graduates of Harvard, Yale, Princton and other colleges and universities, are members. Among these are A. A. Fowler, resident partner of Rogers, Brown & Co., New York; D. A. Reed, assistant counsel for the Steel Corporation in the government suit; A. R. and R. E. Flinn and Charles Dupuy, of Pittsburgh; Percy Houghton, the Harvard football coach and other prominent football men and athletes. The necessary funds for the troop were donated by E. H. Gary, chairman of the Steel Corporation; Geo. W. Perkins, J. P. Morgan, Brown Bros., Peter Choate Price and White, Weld & Co., all of New York. Various automobile companies have furnished cars, including four by the Autocar Co.; two trucks by the International Motor Co.; one armored car with revolving gun turret and one field ambulance by the Cadillac Co.; one truck each by the Garford Truck Co., by the Morton Truck & Tractor Co., Harrisburg, Pa., and by the Buick Co.; one pleasure car chassis by the Simplex Co., one touring car, two bodies and other equipment by the Mitchell Motor Car Co., and two motorcycles by the Hendee Mfg. Co. The Carnegie Steel Co. furnished armor for three of the trucks which can be used also for protection of the machine guns and their crews in action in the field; the Hay-Budden Mfg. Co., Brooklyn, an anvil; Bought & Williams, New York, a forge and vise; the Pyrene Mfg. Co. has equipped all the cars with fire extinguishers and the Stewart-Warner Speedometer Co. has fitted them with speedometers. The United States Tire Co. has furnished spare tires for many of the cars, and the American Trading Co. has loaned tow ropes and tackle.

Captain Wm. J. Smedberg Jr., Second United States Cavalry, the machine gun expert of the United States army, will accompany this motor gun troop as officer of instruction.

Among the other iron and steel men who will be at the camp are C. E. Bertie, of Rogers, Brown & Co., Philadelphia; Robert Bolling, of the Carnegie Steel Co., Philadelphia; Andrew Wheeler, of Morris Wheeler & Co., Philadelphia, and others.

# Quiet Times

### In the Extreme Northwest—Alaskan Demand May Help

Seattle, Aug. 16. — The past three months have been decidedly quiet ones for the iron and steel people of the northwest. Prices have fluctuated very little in that time, but the volume of business has been far below normal. There is little encouragement coming from the sawmills, the great standby of the section. Forty per cent of the mills are said to be idle and the present prices of lumber do not hold out much hope for an early revival. Attempts are being made by many mills to hold their crews together for immediate effective work in case prices should take a turn for the better.

The Alaskan situation gives promise of some relief to the local iron and steel people. The Guggenheims are in the market for railway equipment. They have been ascertaining prices and buying rather liberally of the articles needed in their northern development work. The Alaskan railway commission maintains offices at this point and northwest plants are in a position to share in supplying necessary articles of construction such as iron bars, boiler plates, splice bars, rail, etc.

So far as any labor troubles are concerned, they seem afar off. The tendency to start such things is kept rather quiescent by such organizations as the United Metal Trades Association and the Employers' Association of Washington. Troubles are nipped in the bud without a chance to become formidable. It would also require an unusual amount of temerity on the part of anyone who would seek to create a labor disturbance with industries in their present condition.

As a result of the protest recently made by Seattle trade unionists against the policy toward labor and labor legislation outlined by W. C. Edes, chairman of the Alaska Railroad Commission, the American Federation of labor will be asked to fight for a measure in the next congress to give citizens of the United States preference in the employment of labor on all public works undertaken by the federal government. This request is to come from the Metal Trades Council of Seattle, which is the local central organization of the many unions of metal workers.

# Copper and Zinc

### Will be Refined in a Smelter at Trail, British Columbia

Toronto, Aug. 17. — The problem of supplying the shell manufacturers with the zinc and copper required for shells, without its being necessary to import these metals from the United States has for some time been engaging the attention of the Canadian shell committee. Conferences have been held with the Canadian government, and an arrangement has been made, under which both copper and zinc will be refined at the Trail, B. C., smelter of the Consolidated Mining & Smelting Co., of Canada. The government has also promoted the opening of a plant at Welland, Ont., for the smelting of zinc ore by the electric process. A company, to be known as the Canadian Zinc Co., will be incorporated with an authorized capital of $500,000, which will be backed by the Weedon Mining Co., Sherbrooke, Que.

# Plant Taken Over

Chicago, Aug. 17.—Announcement has been made by President Julius Rosenwald, of Sears, Roebuck & Co., of the sale of its subsidiary, the Meriden Arms Co., Meriden, Conn., to the Westinghouse Electric & Mfg. Co., for $500,000. The plant will be used by the Westinghouse company to help fill the large order for rifles it has taken from the Russian government.

# News of Employers and Employes

## Commission on Industrial Relations Unable to Agree—Developments in Labor Controversies in New England

CHICAGO, Aug. 17.—Failure of members of the United States commission on industrial relations to reach a unanimous agreement on all points under discussion will result in that body making public 10 conflicting reports on Aug. 23. The reports, which will total more than 200,000 words and cost in excess of $460,000, will be submitted to the sixty-fourth congress, when it convenes in December. The employers who are dealt with in the reports are understood to be already fully advised of their contents.

Chairman Frank P. Walsh said the commission had agreed that everything said by all persons making reports, except George P. West and Luke Grant, who covered the Colorado strike, the Bayonne oil troubles and the structural steel workers' dynamiting outrages would be printed, and that such features of each as any commissioner approved, that commissioner in signing would stipulate. Testimony which was especially sharp and concise and filled with facts was given by Walter Drew, counsel for the National Erectors' Association, showing the criminal tactics of the steel workers' union in its dynamiting campaign. This testimony was given before the commissioner shortly before it closed its hearings in Washington a few months ago and was printed at some length in *The Iron Trade Review*.

The reports, as given out by Mr. Walsh, will include:

1. The report of Basil M. Manly, "to be concurred in in whole or in part by a number of commissioners". This report is expected to attack the Rockefellers and to be supported by labor union members of the commission.

2. The report of Prof. John R. Commons, of the University of Wisconsin, "to be concurred in in whole or in part by a number of commissioners". Recommends legislation of the secondary boycott.

3. The report of Commissioner Harris Weinstock, of California, for employing members of the commission, "to be concurred in by the employers only". This is expected to present the employers' view.

4. The report of Commissioner James B. Lennon, representing organized labor, "to be concurred in in whole or in part by some of the commissioners". Expected to condemn employers.

5. The report of Commissioner James O'Connell. Expected to be similar to Commissioner Lennon's report.

6. The report of George P. West on the Rockefeller situation in Colorado. Expected to criticise the Colorado Fuel & Iron Co.

7. The report of Luke Grant on the structural steel workers and the McNamara case. Grant is a writer on labor matters and is a member of the carpenters' union.

8. The report of Prof. Robert F. Hoxie, of Chicago University, on scientific management. The report is expected to be largely academic in character.

9. The report of Commissioner Austin B. Garretson, of Iowa, on causes of industrial unrest. This report is expected to champion labor's side of the case.

10. The report of Chairman Frank P. Walsh on causes of industrial unrest. This report is expected to assail the Rockefellers, the American Telephone & Telegraph Co. and the fertilizer interests.

Professor Commons recommends legalization of the secondary boycott by congressional act and limitation of public inquiry into labor disputes to those unanimously requested by all parties concerned. These sensational suggestions were heightened by reason of the fact that they come from Prof. Commons. It was generally thought that his report would be considerably milder than that of the average member.

Should congress attempt to act upon recommendations to be made to it by the commission, which adjourned today and went out of existence, the bitterest fight is expected to center upon the report prepared by Prof. Commons.

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## Situation Improves

New York, Aug. 14.—The machinists' campaign for an eight-hour working day, and for time and a half payment for all overtime work, continues a disturbing factor to industry in the New England and other eastern states, but developments of the last few days indicate that, due to willingness of the employers to accede to the machinists' demands, the present crisis will be passed without the occurrence of any serious disorder. At a recent meeting of union officials in Hartford, Conn., it was decided that peaceful methods should be employed as far as possible in securing the acceptance of the demands and that strikes should be employed only as a last resort. An important feature of this conference of union leaders was the decision not to accept, in lieu of the eight-hour day and time and a half pay for overtime, the bonus systems which a number of New England plants have put in force for the benefit of their employes.

One of the plants at which a strike was thought likely is that of the Locomobile Co. of America, Bridgeport, Conn. This company recently offered its employes a bonus system, but to this the machinists objected, demanding an eight-hour day, time and a half pay for overtime, double time for work on Sundays and holidays and 15 per cent higher wages for regular night work. These demands will be granted by the director of the company. The Burns & Bassick Co., Bridgeport, has agreed to make a partial concession to its men. Other plants in Bridgeport at which the men threaten strikes are those of the American & British Mfg. Co. and the Lake Torpedo Boat Co.

In New York, the strike at the Garvin Machine Co.'s plant is being watched with considerable interest, since this concern is a member of the National Metal Trades Association, which has decided to oppose the machinists' demands, which involve an eight-hour day, time and a half pay for overtime, and a 15 per cent increase in wages. Union officials say the granting of an eight-hour day and increased wages to some of its men by the E. W. Bliss Co., Brooklyn, is acceptable for the time being but that if the more favorable terms are not extended to the other men a strike will be called. At Hyde Park, Mass., the Becker Milling Machine Co.'s men are on strike, and the B. F. Sturtevant Co.'s men have formulated demands and threaten to strike if they are not granted. At Bayway, N. J., a strike at the Waclark Wire Co.'s plant has been settled by the company's offer to increase wages by 10 per cent. At the plant of the Sloan & Chace Mfg. Co., Newark, N. J., the strike is weakening.

# "We Have No More Tools to Sell"

## This Expression is Heard More Often Than Any Other in Machinery Circles Today—War Demand is Unabated

THE MACHINE tool market continues to be featured by a demand of huge proportions for all kinds of machine tools for manufacturing munitions of war. One machine tool interest, which is among the largest in the country, states that this demand, if anything, has been heavier during the past week than at any time previous since the outbreak of the war. Further large orders were placed for shipment to Russia, England and France and a great deal of business also originated from other countries, including one which heretofore has not been buying in the United States on a large scale. The business now being entered is exceedingly large but not nearly as large as would be the case if dealers and manufacturers were not so thoroughly sold up. The expression which perhaps is heard more often than any other in machinery circles is "We have no tools to sell." Dealers continue to scour the market for second hand tools but the supply in this direction constantly is becoming more limited. At least a few large dealers of late have made arrangements for the manufacture of lathes in plants which previously had been engaged on other classes of machinery. As a result, some concerns now again are booking orders for lathes for October delivery.

A great many concerns such as the Richmond & Potomac Mfg. Co., Baltimore, continue to figure on contracts for shrapnel and high explosive shells. The General Electric Co., Ingersoll-Rand Co. and other concerns are understood to be figuring on new munition contracts on which they propose to engage their plants as soon after deliveries on the present contracts have been completed. Among concerns which now are entering into the manufacture of shells, are the Milton Mfg. Co., Milton, Pa., and the Union Switch & Signal Co., Pittsburgh. The Union Switch & Signal Co. just has completed negotiations for the purchase of some $250,000 to $300,000 worth of machine tools, while the Milton Mfg. Co. has purchased approximately $300,000 worth of tools. The Baldwin Locomotive Works, the American Locomotive Co. and the General Electric Co. all are in the market for large numbers of lathes, turret lathes, screw machines and other equipment, but the difficulty of securing deliveries is holding up purchases. The Snead & Co. Iron Works, Jersey City, N. J., is in the market for a number of lathes in addition to those recently purchased. Of considerable interest is a report that the Seaboard Air Line is inquiring on a list of machine tools, which is to supersede the list of about 100 tools, issued some two months ago. This report, which has not been verified, is rather surprising in view of the statement of a Seaboard Air Line official last week to the effect that that interest had decided to postpone all purchases of machine tools into the future. Among other items of interest is a list of machine tools put out by the Simplex Automobile Co., New Brunswick, N. J., to be installed in a large addition which that company now is about to erect. The American Smelting & Refining Co., 120 Broadway, New York, has put out inquiries for a number of lathes, milling machines, motor-driven grinders, etc., for shipment to Chile; this company still is in the market for several cranes. The Delaware, Lackawanna & Western railroad has put out inquiries for a 42-inch coach wheel lathe and for three or four smaller machine tools. The Lehigh & New England railroad, it is believed on good authority, within the next week or two will distribute orders on the large list of machine tools for installation in its new shops at Pen Argyle, Pa. The Lehigh & New England railroad has bought a 10-ton and a 35-ton Whiting crane. The Pennsylvania Steel Co. last week purchased a small crane and continues to figure on a number of other cranes. The Raritan Copper Co., Perth Amboy, N. J., has purchased a 10-ton Alliance crane. The Lake Torpedo Boat Co., Bridgeport, Conn., purchased a 15-ton, 8-wheeled crane from the Browning Co. Chas. P. M. Jack, 17 Battery place, New York, has purchased a ship building crane and an 8-wheeled locomotive crane from the Brown Hoisting Machinery Co., for installation at the old Roach ship yard in Chester, Pa. The Baltimore Dry Dock & Ship Building Co. has purchased three ship building cranes, two from the Brown Hoisting Machinery Co. and one, a second-hand, McMyler machine. Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, now is in the market for five cranes, having put out an inquiry for an additional crane last week. The Bethlehem Steel Co. is in the market for nine cranes. The Alpha Portland Cement Co., Easton, Pa., is taking bids on a crane for handling a three-cubic yard bucket. The Seaboard Air Line is in the market for one 150-ton crane and several smaller cranes. It is understood the New York Ship Building Co., Camden, N. J., shortly will be in the market, since it is working on plans for improvements. The Newport News Ship Building & Dry Dock Co. has placed orders for considerable punching and shearing machinery. The Norton Grinding Co., Worcester, Mass., just has placed an order for a 10-ton Pawling & Harnischfeger crane. The Crocker-Wheeler Co., Ampere, N. J., is taking bids on two 5-ton and two 10-ton electric traveling cranes. The Fore River Ship Building Corporation, Quincy, Mass., which is taking bids on a large list of machine tools, is in the market for 10 electric traveling cranes; a number of other crane inquiries are out in the east.

Among eastern concerns who are extending their capacities are the New Process Gear Corporation, Syracuse, N. Y.; General Abrasive Co., Niagara Falls, N. Y.; Union Forging Co., Union, N. Y.; Blanchard Machine Co., Cambridge, Mass.; Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.; J. Wiss & Co., Newark, N. J.; Rowe Calk Co., Southington, Conn.; Sterling Blower Co., Hartford, Conn., and the Sperry Gyroscope Co., Brooklyn. Among developments of the past week were further advances in machine tool prices by a number of makers. Quotations on machine tools including shapers, planers, drill presses, slotters, etc., now are at least 10 per cent higher than before.

### *Stamping Works Sold*

THE Avery Stamping Works, Cleveland, has been sold to a Moline plow manufacturing company, $35,000 cash being paid on a total amount of $350,000.

# This Floor Was Laid to Last

¶ The Parish & Bingham Company wanted what would be the most practical, economical and durable floor in their new plant.

¶ It would have to carry heavy stamping machinery—to stand severe trucking and hauling; the fabrication and riveting of automobile frames.

¶ They investigated flooring materials. They sifted down the experience of other manufacturers—and the result was the selection of an

## AYER & LORD
### INTERIOR WOOD BLOCK FLOOR

THIS SHOWS HOW THESE BLOCKS ARE LAID. THE FLOOR BECOMES IRONED OUT BY USE INTO A DENSE, SOLID, SMOOTH, UNIFORM MASS.

Now—they've got a floor that will outlast the building without one cent more being spent upon it for repairs. These creosoted wood blocks, under the heaviest and hardest usage, only bind together with increased density, providing a surface that grows constantly better, firmer and smoother.

These manufacturers get their trucking done with less labor—and quicker. Their employees work better and faster, because they find these blocks are warm, dry, resilient and easy on the feet. The whole plant is dustless, noiseless and sanitary and the floor does not reflect light. Tools and castings are far less liable to be damaged.

It certainly paid the Parish & Bingham Company to investigate flooring the way they did. It will pay you, too. Look into this floor business, even if you're not particularly interested in the question just now. You're surely going to have the problem to deal with some time later.

**Ayer & Lord Wood Block Floors**

Have proved they
—carry the heaviest loads
—stand the hardest wear
—resist fire and heat
—don't swell or buckle
—are dustless, noiseless, dry and sanitary
—are easy on the feet

**Write Us for New Booklet "FLOORS"**

It contains further information—photographs of installations of every character. Tell us something of your problems—our Engineering Department will gladly advise and specify to suit your conditions without any obligation being incurred.

**Ayer & Lord Tie Co**

Railway Exchange CHICAGO

CLEVELAND, OHIO
926 Illuminating Building

KANSAS CITY, MO.
1117 Rialto Building

MEMPHIS, TENN.
142 Exchange Building

PHILADELPHIA, PA.
319 Perry Building

12

AYER & LORD TIE CO. INCORPORATED — AYER & LORD INTERIOR — Always Easy on the Feet — WOOD BLOCKS — RAILWAY EXCHANGE, CHICAGO

The buyer has accepted a $12,000,000 order for 3-inch high explosive and shrapnel shells. Part of these will be made in the Cleveland factory, which will have a capacity of 2,000 shells per day. It is said that the order calls for 700,000 shells, to be delivered within 18 months. This indicates that the Avery plant will manufacture about half of the order. The Cleveland Crane & Engineering Co., Wickliffe, O., is building a three-story addition to its plant, which is to be used, it is said, for the manufacture of hydraulic presses.

Agents acting ostensibly for a large London and Paris banking house have been in Cleveland for several days, negotiating through a local bond and mortgage firm for rifles, cartridges and 6-inch shells. The rifle order calls for 2,000,000 weapons of the Spanish Mauser type, and amounts to $57,000,000. Some difficulty is being experienced in placing the cartridges, of which 5,000,000,000 are asked.

### *Domestic Sales Heavier at Pittsburgh*

BUILDERS of heavy rolling mill equipment in Pittsburgh are enjoying considerable activity. Most of them are filling contracts for owners of rolling and finishing mills in this country, but the Mesta Machine Co. and the Seaman-Sleeth Co. also are shipping engines and rolls to Australia. The former company has just received an order for a 1,500-horsepower mill engine for the Broken Hill Proprietaries Co. Ltd., New Castle, Australia, which will be the fourth unit furnished by the Mesta company for the Proprietaries company. Mackintosh, Hemphill & Co. has completed a universal mill and has taken an order for a billet mill of the turnover type for the United Steel Co., Canton, O.

The United Engineering & Foundry Co. is at the present time enjoying a heavy volume of domestic business and the A. Garrison Foundry Co. is operating at capacity with enough orders on its books to assure continued activity for many months. The Alliance Machine Co., Alliance, O., has been awarded a contract for 12 5-ton electric cranes and 2 large ladle cranes for the Aliquippa works of the Jones & Laughlin Steel Co., Pittsburgh. The ladel cranes will be used in the open hearth steel department.

No official announcement has been made to show the significance of the crane order, but it is apparent that the crane will not be used in the tin mill. Machine tool dealers say demand is fully as heavy as at any time during the last six months. Sales of equipment for domestic use are becoming heavier in volume.

### *Scarcity of Tools Felt in Chicago*

THE MACHINERY market in Chicago is characterized by efforts of local manufacturers, who have taken munition contracts, to get equipment to meet their obligations. Domestic demand continues to be slack, due in part to recent increases in prices which have kept buyers out of the market.

Sellers are unable to fill war orders, except in occasional cases where they had a few machines or tools on hand, or were able to obtain them second hand. Dealers who made early contracts are now getting deliveries, which relieves the situation here and there. Another change has taken place in the character of demands, in that lathes of large size are being sought to turn out high explosive shells from 9 inches upward. The American Car & Foundry Co. came into the market last week for 150 lathes, 27 inches and larger for its Detroit plant to make 9-inch shells from forgings. The company was able to pick up 14 lathes in the Chicago market and is combing the market for more. Those eight which were bought were taken from the following dealers. The Rumely-Wachs Co., two; the E. L. Essley Machine Co., two; Hill, Clarke & Co., eight; the Charles Molitor Machine Co., one, and the H. A. Stocker Machine Co., one.

Among those inquiring for large requirements are the Canadian Car & Foundry Co., Pettibone, Mulliken & Co., and the Edward Valve & Mfg. Co. Manufacturers heretofore engaged in other lines have gone into the machine tool making business where their equipment would permit it. One Chicago concern recently took an order for 200 11-inch lathes for export to be followed by a continuing order over two years.

### *Cartridge Making Equipment in Demand*

IN CINCINNATI machine shops are being urged to take sub-contracts for rifle and machine gun cartridges, as the original contractors for these munitions have been unable to turn them out as fast as demanded by the warring European nations. Demand is still heavy for lathes from France and Italy, but representatives from these countries, who have authority to place $100,000 worth of these tools for immediate delivery, have been unable to place their orders. A review of machine shop orders show that fully three fourths of the machine tools being made at present are for delivery in this country, as domestic business is preferred to that for foreign delivery. Inquiries have been gradually increasing during the past month for bench grinders and drills, and also for punch presses used in the manufacture of cartridges.

## EASTERN STATES

BOSTON.—Standard Thermometer Co. of Maine has purchased a site at Dorchester, Mass., on which it will erect a plant.

CAMBRIDGE, MASS.—Blanchard Machine Co. has commenced work on a 1-story and basement, 25 x 60-foot machine shop addition.

QUINCY, MASS.—Fore River Ship Building Corporation is taking bids on a large list of machine tools. In addition, the company is in the market for one 30-ton, four 15-ton, and six 5-ton electric traveling cranes.

BRIDGEPORT, CONN.—Jas. A. Taylor, owner of the New Lebanon Iron Foundry, at East Port Chester, Conn., has acquired the old chemical plant adjacent to the new plant of the Max Ams Machine Co. here, and has equipped it as an iron foundry. The East Port Chester plant will continue to operate.

SOUTHINGTON, CONN.—Rowe Calk Co. has let a contract for a 2-story, 50 x 70-foot calk factory.

BUFFALO, N. Y.—Kellogg Structural Steel Co. has increased its capital stock from $15,000 to $30,000.

BUFFALO, N. Y.—Hewett Steel Corporation has been incorporated; $10,000 capital stock; by G. U. Harmon, C. M. Baldy and E. H. Letchworth, all of Buffalo, N. Y.

MONTOUR FALLS, N. Y.—Shepard Electric Crane & Hoist Co. is building an 80 x 110-foot extension to its erecting shop.

NEW YORK.—J. L. Mott Iron Works, Seventeenth street and Fifth avenue, has plans for the erection of a 1-story addition to its plant here.

NEW YORK.—Delaware, Lackawanna & Western railroad is in the market for a 42-inch coach wheel lathe and for three or four smaller machine tools.

NEW YORK.—American Smelting & Refining Co., 120 Broadway, is in the market for lathes, milling machines, motor-driven grinders, etc., for installation on its property in Chile.

NIAGARA FALLS, N. Y.—General Abrasive Co. has let a contract for a 3-story, 40 x 125-foot crushing plant.

SYRACUSE, N. Y.—New Process Gear Corporation has let a contract for a 4-story, 55 x 160-foot plant for making automobile gears.

UNION, N. Y.—Union Forging Co. has commenced work on a 1-story, 115 x 136-foot plant.

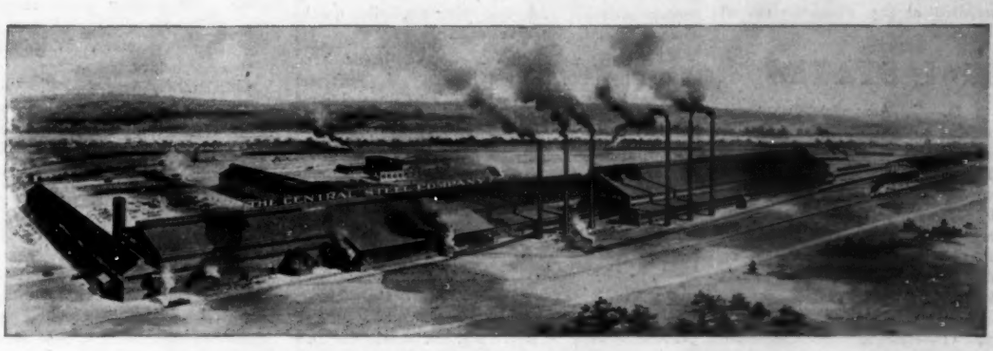
ERIE, PA.—Plant of Bay City Forge Co. here suffered considerable damage by fire.

ERIE, PA.—The Pennsylvania railroad, the New York Central railroad and the city are considering plans for the elimination of grade crossings; the city's share of proposed undertakings will involve an expenditure of $550,000.

NEWARK, N. J. — J. Wiss & Sons Co., manufacturer of cutlery will build a 4-story

AGATHON AGATHON AGATHON AGATHON

# Agathon Steel is the Product of an Organization that You can depend on



*PLANT OF CENTRAL STEEL CO. AT MASSILLON, OHIO*

A superb plant is not your only guarantee of the maintenance of Agathon standards. Back of the plant stands the organization of the Central Steel Company—a body of men trained to make steel to fit YOUR requirements.

In a new plant with an organization of Mature, Experienced Experts WE CAN FURNISH YOU THE KIND OF STEEL YOU WANT WHEN YOU WANT IT.

**Standard Alloy Steels** **Bars, Billets**
**Special Steels rolled to your Specifications** **Slabs, Blooms**

## The Central Steel Company

**MASSILLON, OHIO**

**—Detroit Office—**

**326-27-28 Ford Building, F. Walter Guibert, Sales Manager**

AGATHON AGATHON AGATHON AGATHON

addition containing 18,750 square feet of floor space.

NEW BRUNSWICK, N. J.—Howe Rubber Co., John Tenney Jr., president, contemplates the erection of a large factory building.

NEW BRUNSWICK, N. J.—Simplex Automobile Co. is inquiring on a list of machine tools. This concern has let a contract for the erection of a 2-story, 70 x 100-foot addition.

PERTH AMBOY, N. J.—American Smelting & Refining Co. will erect a plant for the reduction of Bolivian tin ores.

TRENTON, N. J.—Howard Demountable Rim Co., plant damaged by fire will be rebuilt. William M. Howard is treasurer.

BALTIMORE, MD.—An addition to cost approximately $500,000, will be built at the plant of the Baltimore Car & Foundry Co. at Curtis Bay, Md. The work of the company will be extended to include steel construction and bridge work.

WASHINGTON, D. C. — Bids will be received until August 28 by the bureau of yards and docks for hydro-pneumatic freight elevators to be installed at the naval station at Pearl Harbor, Hawaii.

## CENTRAL STATES

CINCINNATI, O.—O. Armleder Co., manufacturer of automobile trucks, will build a service station 75 x 154 feet at York street and Western avenue. Light equipment will be needed.

CINCINNATI, O.—Globe Automatic Register Co. has been incorporated with a capital stock of $100,000 to manufacture a recording device for stores and offices. The company is operating at present, but may change its location and enlarge its facilities.

CINCINNATI, O.—Officials of Cincinnati Southern railroad announce that plans are being prepared for a new bridge over the Ohio river to replace the present structure. Issuance of $2,500,000 worth of bonds by the railroad for the bridge was authorized Aug. 2.

CINCINNATI, O.—Bids on the new $1,000,000 Hyde Park high school will be received until about Sept. 5. The plans include five academic buildings, bridge, tower, gymnasium and manual training building. Bids will include the furnishing of the equipment for the shops and foundry of the manual training department.

CLEVELAND.—Union Paper & Twine Co., 113 St. Clair avenue, will build a $100,000, three or 4-story concrete and steel warehouse. Forest City Engineering Co., Hippodrome building, is preparing plans.

CLEVELAND.—A $100,000, 13-story addition will be erected by the Hollenden Hotel Co. Preliminary plans and specifications are being prepared by George S. Hammond, architect, 4220 Prospect avenue, Cleveland.

CLEVELAND.—O. C. Barber Mining & Fertilizer Co., of which H. V. Briggle, 706 Courtland building, Cleveland, is general manager, plans to erect a large plant in North Industry, O. The plans provide for a large grinding and kiln building and also for a machine shop. Crossley Engineering Co., Canton, O., is the engineer.

DAYTON, O.—J. C. Bland, of the Pennsylvania railroad, announces that it will accept the plans of Morgan Engineering Co. for a $300,000 bridge.

EAST LIVERPOOL, O.—Bonds are being issued for a $60,000 municipal electric light plant.

HAMILTON, O. — American Foundry, at Lindenwald, O., plans $6,000 addition to its core ovens.

HILLSBORO, O. — Bids will be opened Sept. 6 for the construction of a steel bridge over Rocky Fork creek. B. O. Pratt, surveyor, Highland county.

MANSFIELD, O.—A bond issue of $100,000 for an addition to the sewage disposal system, has been voted on and passed.

NEW CASTLE, O.—Steel Car Forge Co. will start work shortly upon the erection of a large addition to its machine shops. Considerable new equipment will be installed.

NEW PHILADELPHIA, O.—Goshen township has voted $135,000 for a new school building.

SHARON, O.—Work on the new plant of the Knox Pressed & Welded Steel Co., Pittsburgh, Pa., to be built at Wheatland, O., near Sharon, has started. Modern equipment will be purchased.

SPRINGFIELD, O.—The board of education, W. H. Holmes, clerk, will receive bids until Aug. 23 on two motor-driven lathes, 8-inch swing, 18-foot bed; four motor-driven lathes, 6-inch swing, 14-foot bed; one motor-driven lathe, 5-inch swing, 11-foot bed; two motor-driven lathes, 6-inch swing, 11-foot bed; one motor-driven shaper, back-geared, 20-inch stroke; one pedestal type, motor-driven dry emery grinder and one single-spindle quick-change speed, sensitive drill.

STEUBENVILLE, O. — Bids have been asked by the commissioners of Jefferson county for the construction of bridge No. 8 in Smithfield township and for repairing bridges in Dillonvale; J. J. Means is county auditor.

TOLEDO, O.—Gartland Toledo Foundry Co. has been incorporated; $80,000 capital stock; by M. F. Gartland, John C. Haswell, T. H. Gartland, R. S. Holbrook and William L. Holbrook.

WARREN, O.—Trumbull Steel Co. has increased capital stock from $2,500,000 to $4,000,000. This capital will be used for extensions; plans under consideration have not been announced.

WILMINGTON, O. — Wilmington Casting Co. has awarded a contract for a new foundry.

YOUNGSTOWN, O.—American Tar Products Co. plans to increase capacity of its works at Crab Creek.

YOUNGSTOWN, O.—Board of education has been granted permit to erect a forge shop at the South high school; the shop will be completely equipped.

YOUNGSTOWN, O.—Wallis & Corley Co. have been awarded the contract for erecting the P. L. Kimberly nurses home in connection with the Buhl hospital at $60,000; C. H. and C. F. Owsley are the architects.

YOUNGSTOWN, O.—The Republic Iron & Steel Co. is receiving bids on two pipe mills, to be installed in the works at Lansingville, O.; the company has an extensive program of improvements and extensions under consideration.

KENOVA, W. VA.—Sanitary Mfg. Co. has been incorporated; $300,000 capital stock; by O. M. Bake, president, H. R. Wyllie, D. E. Abbott and John T. Davis. The company has acquired a portion of the Independent Steel Co.'s plant and will install a brass foundry and machine shop.

PARKERSBURGH, W. VA.—The city contemplates the erection of a $100,000 municipal hospital.

ELIZABETHTOWN, KY. — Cumberland Traction Co. has been incorporated for the construction of electric railroads; $50,000 capital stock; by G. H. Greenup.

LOUISVILLE, KY.—Henry Bros., Fourteenth and Maple streets, will purchase sheet metal working machinery for the manufacture of steel refrigerators.

ANDERSON, IND.—Dice Machine Co. has been incorporated to manufacture engines and motors; $10,000 capital stock; by T. C. Werbe, Spencer Hickman and E. F. Dice.

KOKOMO, IND.—Kokomo Brass Co. will erect two 3-story additions to its present plant thereby doubling the capacity. The company makes automobile parts. W. J. Johnson is general manager.

MADISON, IND. — Thomas Graham Co., spoke manufacturer, has let a contract for the erection of a factory building and will purchase power and woodworking machinery.

SOUTH BEND, IND.—Burnoil Engine Co. has been incorporated to manufacture engines; $50,000 capital stock; by Carl A. Ross, Samuel B. Pettingill, South Bend, Ind., and Rasmus M. Hoid, Chicago.

TELL CITY, IND. — Woodworking and planing mill equipment will be needed by the Tell City Planing Mill Co., which has been incorporated with $40,000 capital stock. John H. Kreisle is president of the company.

WASHINGTON, IND.—Bids will be asked in September by the county on one 60-foot steel span and four 20-foot steel spans.

CHICAGO.—A 10-story building has been decided upon for the West Side Chicago postoffice. All modern appliances for handling of mail will be installed. Byron Newton, of the treasury department, Washington, D. C., is acting secretary.

DETROIT.—The L. F. Bromley Co. has been incorporated to manufacture and sell machinery of all kinds; $50,000 capital stock; by Frank L. Bromley, Birmingham, Mich., Harry K. Curtis and Joseph Willis, Detroit.

LUDINGTON, MICH.—Gile Boat & Engine Co. changes is name to Gile Tractor & Engine Co.

MIDLAND, MICH.—Survey and preliminary plans have been completed for a hydro-electric project for the Tittabawassee Power Co. Frank I. Wixom is resident manager.

GREEN BAY, WIS.—Bids will be received until August 30 by the commissioners of streets and bridges for a $65,000 Strauss bascule and a swing bridge. A. Braun is city engineer.

GREEN BAY, WIS. — Hartman-Greilling Co. is constructing a 4½ to 5-yard steel dipper dredge for the United States government, to be used at Duluth and Superior. Maj. Holland William Baker is assistant chief engineer.

MILWAUKEE. — Kieckhefer Elevator Co. has been awarded all the elevator work on the $400,000 Palace Hippodrome building.

MILWAUKEE.—Plans are being prepared by Carl Barkhausen, Milwaukee, and W. L. Stebbins, Chicago, for a 4-story and basement, 75 x 120-foot hotel, to be erected at Third and Sycamore streets. The structure will be steel and concrete with foundations to accommodate four additional stories. Two electric passenger elevators and one electric freight elevator will be installed.

PEPIN, WIS.—Pepin Electric Co. has been incorporated; $5,000 capital stock; by C. J. Theiss, C. E. Jackson and C. J. Johnson.

ALLENTOWN, MO.—This city is to buy an air compressor and waterworks pump. Engineer recommends a twin, steam turbine-driven centrifugal pump.

PICKERING, MO.—A special election July 27 favored the construction of a municipal electric lighting system.

PLATTSBURG, MO.—Plans are being prepared by E. B. Murray, 920 Walnut street, Kansas City, Mo., for a $28,000 water works system.

ST. LOUIS.—Mercantile Trust Co. is to build a $500,000 addition to its building at Eighth and Locust streets.

ST. LOUIS.—Plans are being prepared by J. M. Dunham Co., 1018 Chemical building, for a 5-story, steel and reinforced concrete building at 410 Washington avenue, for Joseph K. Foster. The estimated cost is $73,000.

ST. LOUIS.—A contract giving a local corporation the right to use the municipal terminal railroad and dock facilities along the

Mississippi river front has been signed by the director of public utilities. The corporation is under contract to build a 1,000,000-bushel elevator within three years, and expects to spend about $3,000,000 in terminal facilities.

BANCROFT, IA.—Bonds for $10,000 have been voted for a municipal electric light plant.

SHELBY, IA.—Bonds for $12,000 are to be sold and the proceeds used for a water works system.

## SOUTHERN STATES

DANVILLE, VA.—The Southern railroad is installing an automatic signal system and will construct a mechanical interlocking plant provided with a power house and distant signals, electric locks, etc.

ANNISTON, ALA. — Jacksonville Light & Power Co. has been incorporated; $10,000 capital stock; by Thomas W. Martin, president, W. R. Loyd and Wiley Alford, all of Birmingham, Ala.

GADSDEN, ALA.—The barb wire mill of the Gulf States Steel Co., will be enlarged by a 60-foot addition. New machinery will be installed.

NEW ORLEANS. — The city council has ordered plans and specifications prepared for a steel frame, concrete viaduct at West End Park.

DEVINE, TEX.—Devine Light, Power & Ice Co. has been incorporated; $35,000 capital stock; by A. Naval, L. F. Price and J. W. Fullerton.

DAYTON, TENN.—City will purchase a motor-driven pump for use at the waterworks plant.

JOHNSON CITY, TENN. — James Grey considers the erection of a hosiery mill. Twenty knitting machines, individually motor-driven, will be installed.

## WESTERN STATES

WILBER, NEB. — County commissioners have asked state engineer Johnson, Lincoln, Neb., to prepare plans for a $5,000 steel bridge over Blue river, near Crete, Neb.

ELLINWOOD, KAS.—The city plans to construct a reinforced concrete bridge consisting of nine spans, 44 feet each, with a 24-foot roadway.

MANHATTAN, MICH. — Manhattan Ice. Light & Power Co., E. A. Wright, manager, is to install a complete new generating outfit at a cost of $30,000.

CHINOOK, MONT.—County commissioners have awarded the contract for the construction of a $6,600 steel bridge over Milk river to O. Peppard, Missoula, Mont.

CORVALLIS, IDA.—Southern Pacific rail road, provided the city grants a franchise, will start the electrification of 43 miles of its line.

WARDNER, IDA.—City council considers the installation of a municipal lighting plant.

BELLINGHAM, WASH.—It is reported that work on 288 miles of track for Bellingham, Mount Baker & Spokane railroad will be started within 90 days. This line comprises part of the proposed transcontinental road from Port Nelson to Hudson Bay. C. E. Wingate, chief engineer of surveys and construction.

CENTRALIA, WASH.—A power plant will be erected immediately to supply the city with light, by H. G. Fleishaur.

EVERETT, WASH.—The boilers at mill A of Weyerhaeuser Lumber Co. will be replaced.

MT. VERNON, WASH.—Plans are being prepared by A. L. Strong, county engineer, for a 200-foot fixed span over Duarband creek near Marblemont, Wash.

SEATTLE.—The board of public works has awarded the contract for a $242,620 steel bridge at Fifteenth avenue to Hans Pederson.

SEATTLE. — The board of public works has awarded Pacific States Construction Co., Burke building, the contract for $111,916.00 substructure of Fremont avenue bridge.

SPOKANE, WASH. — Mayflower Mining Co., operating in Couer d'Alene, Ida., plans construction of a compressor and sinking equipment.

SPOKANE, WASH.—Silverado Mining Co., operating property near Osborn, Ida., will order a compressor, electric power plant and other equipment to be installed at once. C. D. Muxen is secretary.

WENATCHEE, WASH. — County commissioners are planning a $28,000 bridge over the Wenatchee river.

BAKER, ORE.—William Baker Jr., lessee of the West Side mine in the Greenhorn district contemplates the erection of a roller mill at the mine.

PORTLAND, ORE. — The city council has adopted the plans of Whitehouse & Fouilhoux, architects, for a proposed $500,000 municipal auditorium.

PORTLAND, ORE.—The board of public works of Seattle, Wash., has awarded Beers Building Co. the contract for $154,601.00 superstructure of Fremont avenue bridge, Seattle, Wash.

ROSEBURG, ORE. — The supreme court has decided in favor of the issuance of $500,000 bonds by the city to aid in the construction of 38 miles of railroad from the city to Umpqua national forest. The line will be constructed by Roseburg & Eastern railroads.

THE DALLES, ORE.—Nettleton, Bruce & Eschbach have been awarded the contract for construction of a 12-stall, brick and concrete roundhouse, machine turntable, pit and foundation, concrete and brick power house, etc., in this city, as well as a 10-stall roundhouse, turntable, etc., at Pilot Rock, Ore.

## ALASKA

JUNEAU, ALASKA. — Alaska-Juneau Gold Mining Co. will install a 800-ton Marsey rolling mill with a 225-horsepower Westinghouse motor. Stamp mills will be replaced with like machinery if this equipment proves successful.

## NEW CATALOGS

LUBRICATION OF PNEUMATIC TOOLS.—An 8-page bulletin, recently issued by the Chicago Pneumatic Tool Co., Chicago, discusses the lubrication of pneumatic tools and describes automatic oilers adapted to their various pneumatic devices. A grease machine also is shown.

OIL SWITCHES.—In a recently issued bulletin the General Electric Co., Schenectady, N. Y., describes oil switches for use on voltages up to 2,500. These are built in three capacities, non-automatic and automatic for use on two, three and four-wire systems and for current up to 300 amperes. The bulletin contains illustrations and diagrams of the various styles of switches.

PORTABLE TOOLS.—In a 20-page folder issued by the Stow Mfg. Co., Binghamton, N. Y., its extensive line of portable tools is illustrated and described. This includes the following: Two-spindle drill, electric breast drill, universal drill, drill for heavy work, tool post grinder, electric bench grinder, electric hand buffer, portable screw driver, center grinder, radial flexible boring machine, suspended drill, portable emery grinder, motor-driven general utility tool, flexible shaft drilling combination and the flexible shaft combination for use with a scratch brush. All of these tools are motor-driven and are adapted for use in foundries, machine shops and other industrial plants.


## Another Victory

*A victorious army has taken Rtwzcvzxmkl!*

*How interesting! But "up-to-the-minute" sales managers are more interested in*

*TAKING TIPS!*

*START "Driving" and "Flank" one of these!*

*American Car & Foundry Co., St. Louis, Mo., is in the market for 136 27-inch and larger lathes to make 9-inch shells from forgings.*

*C. K. Turner & Son, export agents, 116 Broadway, New York City, are in the market for 8-inch, 10-inch and 12-inch ordinary engine lathes, also 100 automatic turret lathes to take 3-inch to 5-inch bars.*

*The board of education, Springfield, O., will receive bids until Aug. 23 on two motor-driven lathes, 8-inch swing, 18-foot bed; four motor-driven lathes, 6-inch swing, 14-foot bed; one motor-driven lathe, 5-inch swing, 11-foot bed; two motor-driven lathes, 6-inch swing, 11-foot bed; one motor-driven shaper, back-geared, 20-inch stroke; one pedestal type, motor-driven dry emery grinder, and one single-spindle, quick-change speed sensitive drill.*

*Fore River Ship Building Corporation, Quincy, Mass., is taking bids on a large list of machine tools. In addition, the company is in the market for one 30-ton, four 15-ton, and six 5-ton electric traveling cranes.*

*American Smelting & Refining Co., 120 Broadway, New York City, is in the market for lathes, milling machines, motor-driven grinders, etc., for installation on its property in Chile.*

*Delaware, Lackawanna & Western railroad, New York City, is in the market for a 42-inch coach wheel lathe and for three or four smaller machine tools.*

*Snead & Co. Iron Works, Jersey City, N. J., is in the market for a number of lathes.*

*Simplex Automobile Co., New Brunswick, N. J., is inquiring on a list of machine tools. This company has let a contract for the erection of a 2-story, 70 x 100-foot addition.*

*Crocker-Wheeler Co., Ampere, N. J., is taking bids on two 5-ton and two 10-ton electric traveling cranes.*

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## PIG IRON

(Delivery to Dec. 31.)

| | |
|---|---|
| Bessemer, valley | $15.00 to 15.25 |
| Bessemer, Pittsburgh | 15.95 to 16.20 |
| Basic, Pittsburgh | 14.95 |
| Basic, eastern Pa. | 15.50 |
| Malleable, Pittsburgh | 14.95 to 15.45 |
| Malleable foundry, Chicago | 13.50 |
| Malleable foundry, Philadelphia | 15.50 to 16.00 |
| Malleable foundry, Buffalo | 13.50 to 13.75 |
| No. 1X foundry, Philadelphia | 15.25 to 15.50 |
| No. 2 foundry, Pittsburgh | 14.95 to 15.45 |
| No. 2 foundry, valley | 12.75 to 13.00 |
| No. 2 foundry, Cleveland | 14.50 |
| No. 2 foundry, Ironton | 13.75 to 14.00 |
| No. 2 foundry, Chicago | 13.50 |
| No. 2X foundry, Philadelphia | 15.25 to 15.50 |
| No. 2X fdy., N. J. tidewater | 15.25 to 15.50 |
| No. 2X foundry, Buffalo | 13.50 to 13.75 |
| No. 2 plain, Philadelphia | 14.75 to 15.00 |
| No. 2 plain, N. J. tidewater | 14.75 to 15.00 |
| No. 2 plain, Buffalo | 13.00 to 13.25 |
| No. 2 southern, Birmingham | 11.00 to 11.50 |
| No. 1 southern, Cincinnati | 14.40 |
| No. 2 southern, Chicago | 14.50 to 15.00 |
| No. 2 southern, Phila. delivery | 14.00 to 14.25 |
| No. 2 southern, Cleveland | 15.00 |
| No. 2 south'n, New York docks | 13.75 to 14.00 |
| No. 2 southern Boston, docks | 13.75 to 14.00 |
| No. 2 south. interior, New Eng. | 14.50 to 15.50 |
| No. 2 southern, St. Louis | 14.40 |
| Virginia No. 2X furnace | 12.50 to 13.00 |
| Virginia 2X, Philadelphia | 15.25 |
| Virginia 2X, Jersey City | 15.60 to 15.85 |
| Virgina 2X, Boston points | 15.75 |
| Gray forge, eastern Pa. | 14.50 to 14.75 |
| Gray forge, Pittsburgh | 14.45 |
| Gray forge, Birmingham | 8.75 to 9.00 |
| Silveries, 8 per cent, Jackson, O. | 16.50 to 17.00 |
| Silveries, 5 per cent Birmingham | 13.00 |
| Silveries, 5 per cent, Chicago | 16.35 |
| Standard low phos., Phil. | 21.50 to 22.00 |
| Lebanon low phos., furnace | 18.00 to 18.50 |
| Low phos., Pittsburgh | 20.95 to 21.20 |
| Charcoal, Lake Superior, Chgo., Nos. 1 to 4 | 15.75 to 16.25 |
| Charcoal, Buffalo | 15.75 to 17.00 |
| Charcoal, Birmingham | 21.50 |

## IRON ORE

**Lake Superior Ores.**

(Lower lake ports.)

| | |
|---|---|
| Old range Bessemer, 55 per cent. | $3.75 |
| Mesabi Bessemer, 55 per cent. | 3.45 |
| Old range, non-Bess., 51½ per cent. | 3.00 |
| Mesabi non-Bessemer, 51½ per cent. | 2.80 |

**Foreign Ores.**

(Per unit Philadelphia.)
(Prices nominal.)

| | |
|---|---|
| Foreign Bess., 50 to 65 per cent. | 8 to 8½c |
| For'n non-Bes., 50 to 65 per cent. | 8 to 8½c |

## COKE

(At the ovens)

| | |
|---|---|
| Connellsville furnace | $1.50 to 1.60 |
| Connellsville fur. contr. | 1.75 to 1.80 |
| Connellsville foundry | 2.15 to 2.50 |
| Connellsville fdy. contr. | 2.25 to 2.60 |
| Wise county furnace | 2.00 to 2.25 |
| Wise county foundry | 2.40 to 2.60 |
| Pocahontas furnace | 2.00 to 2.50 |
| Pocahontas foundry | 2.25 to 2.50 |
| New River, foundry | 2.50 to 3.25 |
| New River, furnace | 2.25 to 2.50 |

## FERRO-ALLOYS

| | |
|---|---|
| Ferro mang., furnace (prompt) | $95 to 100 |
| Ferro mang., Balti. (future) | 95 to 100 |
| Ferro-silicon, 50 per cent, Pbgh. | 73.00 to 75.00 |
| Ferro-silicon, 50 per cent, Phila. | 73.00 to 75.00 |
| Ferro-sil., 12 to 13 per cent. | 21.00 |
| Ferro-sil., 11 to 12 per cent. | 20.00 |
| Ferro-sil., 10 to 11 per cent. | 19.00 |
| Ferro-sil., 9 to 10 per cent. | 18.00 |
| (Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville.) | |
| Ferro-carbon titanium, carloads, per lb. | 8c to 12½c |
| Ferro vanadium, Pbgh. per lb. alloy | 2.25 to 2.30 |
| Ferro tungsten, per lb. of alloy, nom. | 2.50 |
| Ferro chrome, per lb., Niagara Falls | 20c |

## SEMI-FINISHED STEEL

| | |
|---|---|
| Open hearth billets, Phila. | $30.00 to 32.00 |
| Forging billets, Phila. | 34.00 to 36.00 |
| Forging billets, Pbgh. | 28.00 to 29.00 |

## Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

| | |
|---|---|
| From New York | $0.40 |
| From Pittsburgh | .619 |
| From Youngstown | .619 |
| From Niles | .619 |
| From Wheeling | .619 |
| From Steubenville | .619 |
| From Johnstown | .604 |
| From Coatesville | .545 |
| From Steelton | .555 |
| From Bethlehem | .529 |
| From Cleveland | .65 |
| From Chicago | .765 |

| | |
|---|---|
| Wire rods, Pittsburgh | $27.00 |
| Bess. bill., Youngstown | 22.00 |
| Open hearth billets, Youngstown | 23.00 |
| Bessemer billets, Pittsburgh | 23.00 |
| Open hearth billets, Pittsburgh. | 24.00 |
| Bess. sheet bars, Youngstown | 23.00 |
| Op. h'th sheet bars, Youngstown | 24.00 |
| Bess. sheet bars, Pittsburgh | 24.00 |
| Op. h'th sh. bars, Pbgh. | 25.00 |
| Muck bar, Pittsburgh | 27.00 |

## RAILS AND TRACK MATERIAL

| | |
|---|---|
| Stand. Bess., rails, Pbgh. | 1.25c |
| Stand. open-hearth rails, Pbgh. | 1.34c |
| Lgt. rails, 8-lbs., Pbgh. & Chgo. | 1.22c |
| Lgt. rails, 12 lbs. Pbg. & Chgo. | 1.17c |
| Lgt. rails, 16 to 20 lbs., Pgh. & Chgo. | 1.12c |
| Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo. | 1.07c |
| Relaying rails, standard, Pbg. & Chgo. | $23.00 to 24.00 |
| Relaying rails, light, Chgo. | 21.50 to 22.50 |
| Angle bars, st. sect. Pbgh. base. | 1.50c |
| Angle bars, st. sections, Chicago | 1.50c |
| Spikes, railroad, Pbgh. | 1.40c to 1.45c |
| Spikes, railroad, Chgo. | 1.50c to 1.55c |
| Track bolts, Pbgh. | 1.95c to 2.00c |
| Track bolts, Chgo. | 2.00c |

## Freight Rates, Pig Iron

| | |
|---|---|
| Mahoning and Shenango valleys to:— | |
| Cleveland | $0.95 |
| Newark, N. J. | 3.00 |
| New England | 3.00 |
| Philadelphia | 2.79 |
| Pittsburgh | .95 |
| St. Louis | 3.18 |
| Buffalo to:— | |
| Albany, N. Y. | $1.26 |
| New England (all rail) | 2.58 |
| New York and Brooklyn (all rail). | 2.58 |
| New York and Brooklyn (by canal) | 1.00 to 1.50 |
| Virginia furnaces to:— | |
| Boston docks (r. and w.) | $3.05 |
| New England (all rail) | 3.25 |
| New York dock (r. and w.) | 2.88 |
| Birmingham, Ala., to:— | |
| Cincinnati | $2.90 |
| Chicago | 4.00 |
| Cleveland | 4.00 |
| Louisville, Ky. | 2.65 |
| New York (all rail) | 6.15 |
| New York (rail and water) | 4.25 |
| Philadelphia (all rail) | 5.20 |
| Philadelphia (rail and water) | 4.00 |
| Pittsburgh | 4.90 |
| Savannah, Ga. | 2.75 |
| Chicago, to:— | |
| Des Moines | $2.80 |
| Milwaukee | .50 |
| Moline, Ill. | 1.47 |
| Omaha | 3.58 |
| St. Louis | 1.58 |
| Ironton and Jackson, O., to:— | |
| Chicago | $2.54 |
| Cincinnati | 1.26 |
| Cleveland | 1.62 |
| Detroit | 1.81 |
| Indianapolis | 1.58 |

## SHAPES, PLATES AND BARS

| | |
|---|---|
| Structural shapes, Pittsburgh | 1.30c to 1.35c |
| Structural shapes, Chicago | 1.49c |
| Structural shapes, Philadelphia | 1.459c to 1.509c |
| Structural shapes, New York | 1.469c to 1.519c |
| Struc. shapes, San Francisco | 2.00c to 2.05c |
| Tank plates, Chicago | 1.44c to 1.49c |
| Tank plates, Pittsburgh | 1.30c to 1.35c |
| Tank plates, Philadelphia | 1.459c to 1.509c |
| Tank plates, New York | 1.469c to 1.509c |
| Bars, soft steel, Pittsburgh | 1.30c to 1.35c |
| Bars, soft steel, Chicago | 1.49c |
| Bars, soft steel, Philadelphia | 1.459c |
| Bars, soft steel, New York | 1.469c |
| Hoops, carloads, Pittsburgh | 1.30c |
| Bands, Pittsburgh | 1.30c to 1.35c |
| Shafting, Pbgh., contr. | 60 to 65 off |
| Bar iron, Chicago | 1.20c to 1.25c |
| Bar iron, Philadelphia | 1.35c to 1.40c |
| Bar iron, New York | 1.35c to 1.40c |
| Bar iron, Cleveland | 1.20c to 1.25c |
| Bar iron, Pittsburgh | 1.30c |
| Hard steel bars, Chicago | 1.25c |
| Smooth finish, mchy. steel, Chi. | 1.68c |

## SHEETS AND TIN PLATE

| | |
|---|---|
| No. 28, black, Pittsburgh | 1.85c to 1.90c |
| No. 28, black, Chicago | 1.99c to 2.04c |
| No. 28, tin mill, black, Pbgh. | 1.80c to 1.85c |
| No. 28, galvanized, Pbgh. | 3.75c to 4.25c |
| No. 28, galvanized, Chgo., nom. | |
| No. 10, blue, anld., Pbgh. | 1.35c to 1.50c |
| No. 10, blue, annealed, Phila. | 1.609 to 1.659c |
| Tin plate, 100 lb., coke base. | 3.10c to 3.20c |

## EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

| | |
|---|---|
| Single pickled, cold roll, and re-anl. | 30 cents |
| Hot roll'd pick'd and anl., tin mill | 25 cents |
| Full pickl'd, cold rolled and re-anl. | 50 cents |
| Auto sheets | 75 cents |
| Blued stove pipe stock | 10 cents |
| Range steel | 30 cents |
| Re-squarring | 10 cents |
| Roller leveling | 10 cents |
| Patent leveling and re-squarring | 35 cents |
| Oiling sheets | 10 cents |
| Deoxidizing | 10 cents |
| Lime finish | 10 cents |
| Open-hearth stamping steel, free from mill scale | 55 cents |
| Special open hearth deep stpg. steel free from mill scale | 80 cents |
| Extra deep special auto body stock | $1.25 |
| Ext. for 28 gage ov. 32 to 36-in. wide | 10 cents |

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

## IRON AND STEEL PIPE

(Pittsburgh.)

| | Black. Butt-weld. | Galv. Butt-weld. |
|---|---|---|
| Steel, ¾ to 3 inches | 79 | 63½ |
| Iron, ¾ to 2½ inches | 71 | 52 |
| | Lap-weld. | |
| Steel, 2½ to 6 inches | 78 | 68½ |

## BOILER TUBES

| | |
|---|---|
| Steel, 3½ to 4½ inches l. c. l. | 72 |
| Iron, 3½ to 4½ inches l. c. l. | 61 |

## WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

| | |
|---|---|
| Wire nail jobbers, Pittsburgh | $1.60 |
| Plain wire, jobbers, Pittsburgh | 1.40 |
| Galvanized wire, jobbers, Pbgh. | 2.20 |
| Polished staples, Pbgh. | 1.70 |
| Galvanized staples, Pbgh. | 2.50 |
| Barb wire, painted, jobbers, Pbgh. | 1.70 |
| Barb wire, galv., jobbers, Pbgh. | 2.50 |